# Notes

#### The 1ac is long and if you don’t take the time to highlight the ev you won’t be able to get through it in the allotted time. Cards that are not absolutely necessary have tags that begin with \*\*\* If you don’t read them in the 1ac, the Deforestation and Food Shortage scenarios can be read in the 2ac as addon advantages.

#### Many of the long cards in the 1ac (including ones that have tags that start with \*\*\*) are useful to answer the counterplan in the packet.

#### Future versions of the 1ac should consider adding the Klinger & Naylor, 12 ev “The aquaculture sector has a wide range of innovative technologies and management…”

#### Additional evidence for the Environment NB to the Sustainable Land-Based Aquaculture CP can be found in the aquaculture bad section.

#### The aquaculture good / bad debate is really a link and not an impact debate because of the claims made in the 1ac Sustainability Adv (ie winning those args relies less on proving that disease spread is bad and more on demonstrating that the affirmative actually causes significant disease spread). If you can win that the plan results in net more fish escapes, disease, overfishing of small feeder fish then you will likely turn the sustainability advantage. The aff will make a strong claim to limit or prevent these factors with the inclusion of environmental safeguards in the plan.

#### Two of the 2nc link / internal link cards (from Tracton & Representative Smith) for the NOAA Weather Satellite Tradeoff DA say that too much is spent on weather satellites but do clearly say that the money for them comes at the expense of other ocean programs. In other words, these authors agree with the link (the purpose for which they are used), but not necessarily with the internal link that full funding for satellites is necessary or should come at the expense of ocean programs.

# Aquaculture Aff

### 1ac Plan

#### The United States federal government should create a National Offshore Aquaculture Framework that

#### authorizes the National Oceanic and Atmospheric Administration as the lead federal agency for regulating offshore aquaculture and gives it authority to determine appropriate locations for, permit, regulate, monitor, and enforce offshore aquaculture in the Exclusive Economic Zone

#### requires the NOAA to issue legally binding national standards and regulations to prevent or minimize impacts on the marine ecosystem and fisheries

#### establishes a research program to guide the precautionary development of offshore aquaculture in the EEZ

### 1ac Seafood Imports Adv

#### Contention 1 is Seafood Imports

#### Current regulatory structure blocks development of offshore aquaculture in federal waters --- leads to both under and over regulation and leaves the door open for inevitable legal challenges

Johns, 13 --- J.D. Candidate, USC Law 2013 (March 2013, Kristen L., Southern California Law Review, FARM FISHING HOLES: GAPS IN FEDERAL REGULATION OF OFFSHORE AQUACULTURE,” 86 S. Cal. L. Rev. 681, JMP)

III. DEFICIENCIES OF THE CURRENT REGULATORY SCHEME

The current regime for regulating offshore aquaculture needs to be revised. There is no lead federal agency for regulating offshore aquaculture and no comprehensive law directly addressing how it should be [\*699] administered, regulated, and monitored. Multiple federal agencies are then left to assert their authority to regulate different aspects of offshore aquaculture under a variety of existing laws that were not designed for this purpose. n92 This system can lead to both overregulation of some aspects of the industry, such as overlapping permitting requirements, as well as underregulation of other aspects, such as the effects of escaped farmed fish on natural ecosystems. Furthermore, because none of the existing laws were designed to deal specifically with aquaculture, many are left vulnerable to challenge as proper legal bases for regulatory authority.

A. Administrative Overlap Creates Patchy Regulation

A number of federal agencies have invoked authority to regulate aquaculture activities in federal waters under various statutory authorities: EPA under the Clean Water Act, the Endangered Species Act, the National Environmental Protection Act, the Ocean Dumping Act, and the Federal Insecticide, Fungicide, and Rodenticide Act; NOAA under the Magnuson-Stevens Fishery Conservation and Management Act, the National Marine Sanctuaries Act, the Marine Mammal Protection Act, the Fish and Wildlife Coordination Act and the Endangered Species Act; Army Corps of Engineers under the Rivers and Harbors Act and the Outer Continental Shelf Lands Act; U.S. Coast Guard under the Rivers and Harbors Act; the Fish and Wildlife Service under the Fish and Wildlife Coordination Act, the Endangered Species Act, and the Lacey Act; Food and Drug Administration under the Food, Drug, and Cosmetic Act; and Department of Agriculture under the National Aquaculture Act. Under this patchy regulatory scheme, each agency imposes its own independent requirements with little interagency cooperation or collaboration - resulting in both overlapping regulatory requirements as well as gaps in the regulation of certain serious environmental risks.

The most significant consequence of allowing multiple agencies to invoke regulatory authority over different aspects of offshore aquaculture is that there is currently no centralized or streamlined process for obtaining a permit to operate a farm in federal waters. n93 As discussed in Part II.C, the permitting process is often cited as the single greatest constraint to offshore [\*700] aquaculture development. Because there is no specific permitting system for offshore aquaculture, multiple agencies have invoked their authority to require permits for various aspects of the aquaculture activities. This complex multiagency permitting system is confusing, time-consuming, and costly.

Furthermore, there are instances where the permit required from each agency actually addresses the same problem - allowing some aspects of offshore aquaculture to become even overregulated by various federal agencies. One such example is water quality: the discharge permit required by the EPA controls the direct "discharge of pollutants into the navigable waters" of the United States, n94 while at the same time the Section 404 permit required by the Corps controls the "discharge of dredged or fill material into the navigable waters" of the United States. n95 The Section 10 siting permit n96 required by the Corps also takes into consideration "effects and cumulative impacts upon the water quality." n97 Thus, an aquaculturist must obtain three different permits that all independently evaluate the farm's effect on water quality. It may be that this independent-review approach does more to guarantee that a specific environmental risk like water quality is controlled; yet surely a more coordinated and streamlined process is most efficient for both the government and potential permit seekers.

While the application of overlapping jurisdictions to offshore aquaculture can lead to overregulation of certain environmental risks, it can also lead to underregulation of other risks. The impact of escaped nonnative and transgenic fish on native species is especially likely to avoid regulation. Although the FDA has stated it intends to regulate the use of transgenic fish in aquaculture facilities, it has yet to promulgate any rules and has little expertise in dealing with impacts other than those on human [\*701] health. n98 The EPA may have authority to regulate escaped fish under the Clean Water Act, but only if the farms are considered "point sources" and only if the escaped fish are considered "pollutants." n99 The Endangered Species Act may give authority to NMFS or EPA to consider the impacts of escaped fish on certain native species, but only if those species are listed as "threatened or endangered" by the federal government, n100 which only a few of the species involved in aquaculture are.

Another environmental effect left unsatisfactorily regulated is the impact offshore aquaculture has on the habitats and ecosystems of the marine environment. The Army Corps of Engineers determines if the siting of a certain farm will impact the marine habitat, but it has little expertise in assessing the ecological implications on the marine environment. At the same time, the National Marine Sanctuaries Act gives NOAA authority to regulate actions that might impact habitats in federal waters, but only if those habitats are in federally designated marine sanctuaries. n101 The Magnuson-Stevens Fisheries Conservation and Management Act ("MSA") gives NOAA authority to regulate activities affecting fish populations and habitats, but only if the fishery or habitat is included in a federally designated Fishery Management Plan and only if the aquaculture activity is indeed considered "fishing" under the Act. n102 As it stands, the agency with the least experience in assessing risks to marine habitats, the Army Corps of Engineers, is given primary responsibility to judge whether a farm will negatively impact the marine environment, while the most appropriate agency, NOAA, is given authority to regulate the impacts on only selected marine habitats.

The current administrative overlap occurring in federal waters creates one final concern: with the various statutes triggered by offshore aquaculture, it is unclear which agency should most appropriately take the lead in the industry's regulation and management. n103 For example, the [\*702] Endangered Species Act ("ESA") grants authority to EPA, NOAA, and Fish and Wildlife Service to regulate federal activities that could harm threatened or endangered species. Because the ESA gives three different agencies overlapping jurisdiction, it is difficult to determine exactly which agency is most appropriate to regulate an aquaculture activity. This problem was illustrated in Wild Fish Conservancy v. EPA, in which the EPA mistakenly believed it was the single agency authorized to evaluate a fish farm's effects on an endangered species of salmon. n104 The EPA had endorsed a state regulation that exempted a salmon farm from water quality standards, concluding the regulation would have no adverse effect on the endangered species. A federal court, however, ruled that the EPA did not have authority under the ESA to make this kind of decision on its own. Instead, the EPA had to consult with the appropriate federal environmental oversight body, and "in this case, the appropriate federal environmental body was the [National Marine] Fisheries Service." n105 Had the roles of each agency in aquaculture regulation been previously identified, or had one agency been designated as the "lead" agency to regulate aquaculture, this interagency confusion could have been avoided. n106

B. Ambiguous Legal Bases for Regulatory Authority

Another deficiency of the current regulatory regime for offshore aquaculture is that the regulatory statutory authority of each agency is shaky at best. None of the above-mentioned statutes, with the exception of the National Aquaculture Act, was meant to deal specifically with aquaculture. Each law must therefore be tailored and tweaked to allow the respective federal agency to invoke its jurisdiction, leaving any agency's power to regulate such activities vulnerable to legal challenge. I will describe a few examples.

1. Challenges to EPA's Authority to Regulate Offshore Aquaculture

The EPA has asserted its authority to regulate aquaculture activities [\*703] under the Clean Water Act ("CWA"), which allows it to require "point sources" to obtain permits for any "pollutants" they discharge into "U.S. waters" pursuant to its National Pollutants Discharge Elimination System ("NPDES"). n107 The EPA has decreed that certain aquaculture projects - "concentrated aquatic animal production facilities" ("CAAPs") - are subject to its NPDES permit program and under its regulatory authority. n108 However, three characteristics specific to offshore aquaculture projects leave the EPA's authority under the CWA vulnerable to legal challenge: (1) the offshore location of such projects, (2) the use of net pens and other free-floating facilities, and (3) the kind of "biological pollution" offshore projects can create.

The offshore location of aquaculture projects in federal waters threatens the EPA's authority under the CWA. Under the Act, EPA regulates the direct discharge of pollutants into U.S. navigable waters. "Navigable waters" include interstate waters and intrastate lakes and rivers. n109 An offshore aquaculture farm would not be in the United States' "navigable waters," and would apparently fall out of CWA jurisdiction. Fortunately, the EPA has enacted a rule that calls for any CAAP facilities directly discharging wastewater into U.S. territorial waters (extending to twelve miles offshore) to comply with effluent guidelines. n110 However, an aquaculture farm is considered a CAAP facility subject to CWA regulations only if it is a "significant contributor of pollution to waters of the United States." n111 A farm located far offshore, such as the design launched by Kampachi Farms that can float up to seventy-five miles offshore, n112 may not contribute significantly to pollution in U.S. waters - even though it may create much pollution and environmental damage at its offshore location - and would not be subject to the EPA's regulatory authority. n113

The use of net pens, free-floating devices, and new technological designs in offshore aquaculture projects also leaves the EPA's regulatory [\*704] authority under the CWA vulnerable to challenge. Land-based aquaculture facilities have an obvious or distinct pipe for releasing wastes and other pollutants, allowing these farms to fall clearly within the EPA's authority to regulate "point sources"; n114 the structures used in offshore projects may not. In U.S. Public Interest Research Group v. Atlantic Salmon of Maine, L.L.C. ("USPIRG"), an aquaculturist operating off the coast of Maine argued that its net pen farm was not a point source subject to the NPDES permit program because it was not a "discrete, confined and direct conveyance" of pollutants. n115 Rather, because the net pens were free floating, water could flow through them and disperse any pollutants through the natural processes of tides and currents. n116 The district court rejected this narrow interpretation of a point source, emphasizing that "a point source exists where there is an identifiable source from which the pollutant is released," and concluded that the net pens constituted point sources subject to CWA requirements. n117 Despite this ruling, it is questionable whether new technologies implemented in offshore farms would be considered point sources under the CWA. For instance, unmoored or free-floating open-ocean designs like the one launched by Kampachi Farms are transitory and drift with the currents, and therefore may not represent an identifiable source of pollutants. Thus, the EPA's authority under the CWA to regulate aquaculture in federal waters may disappear as open-ocean technologies advance.

Finally, the CWA only applies to point sources that discharge "pollutants" into U.S. waters. n118 There is no question that this provision allows the EPA to regulate the traditional organic pollutants that are released from fish farms, such as wastes and nutrients. However, offshore farms are more susceptible to another kind of pollution - the accidental release of farmed fish, and it is unclear whether this kind of "biological material" constitutes "pollution" under the CWA. n119 In USPIRG, a federal court agreed that it does, concluding that the "pollutants" discharged from a net pen operation could come not only in the form of harmful pesticides, but also from escaped nonnative fish threatening native wild salmon [\*705] populations. n120 The district court relied on National Wildlife Federation v. Consumers Power Co., which had found that "live fish, dead fish and fish remains annually discharged into Lake Michigan by the ... facility [were] pollutants within the meaning of the CWA, since they [were] "biological materials.'" n121 However, the same year USPIRG was decided, the Ninth Circuit held in Ass'n to Protect Hammersley v. Taylor Resources that biological materials produced from a mussel farm, including feces, metabolic byproducts, and shells, were not considered "pollutants" under the CWA. n122 The Ninth Circuit argued that the pollutants referred to in the CWA were specifically the "waste products of a human or industrial process," and because the mussel byproducts and shells were not man-made, but rather the result of "natural biological processes," the biological waste was not subject to CWA requirements. n123 Thus, a court could hold that escaped fish from offshore farms are not "waste products of a human or industrial process," but rather, like the mussel byproducts, are biological materials not subject to EPA regulatory authority.

In addition to the CWA, the EPA's regulatory authority under various other statutes is vulnerable to challenge. As discussed earlier, a court may decide that the EPA is not the appropriate federal agency to evaluate the impacts of aquaculture operations under the ESA. n124 The Federal Insecticide, Fungicide, and Rodenticide Act gives the EPA authority to regulate pesticides in any agricultural project, but a recent amendment to the Act exempts pesticides used in projects involving "producers of farm raised finfish (e.g., catfish, trout, goldfish, tropical fish, minnows) and/or hatching fish of any kind." n125 The Ocean Dumping Act gives the EPA authority to regulate the dumping of material into federal waters, but the Act also allows for the dumping of "materials when such deposit is made for the purpose of developing, maintaining, or harvesting fisheries resources." n126 An aquaculturist could escape regulation under this Act by simply arguing that any fish farm is a "fishery resource" and that any food, pesticide, or other material added was "for the purpose of developing the [\*706] resource." Finally, although the EPA has authority under the National Environmental Protection Act ("NEPA") to require all federal agencies taking action to assess the impacts on the environment, n127 the statute is not results-based. That is, NEPA cannot prohibit aquaculture activities that may adversely impact the environment - it can only require that such impacts be properly identified.

2. Challenges to the Army Corps of Engineers' Authority to Regulate Offshore Aquaculture

The Army Corps of Engineers presently has the authority to determine the siting of structures in federal waters under the River and Harbor Act of 1899 ("RHA") n128 and the Outer Continental Shelf Lands Act ("OCSLA"). n129 Under these Acts, the Corps can require an aquaculturist to obtain a permit before constructing any facility in federal waters. n130 Yet whether it is appropriate to allow the Corps to control the siting of aquaculture facilities is questionable, due in large part to its lack of expertise in marine ecology. This fact has not gone unnoticed: in 2008, the Corps was sued for issuing an aquaculture research permit without properly considering the impacts the experiment could have on the wild fish populations and their habitats. n131 A federal court found that because the Corps had consulted with experts and gathered opinions from other state and federal agencies - namely, NMFS - about the possible environmental effects of the project, it was justified in issuing the permit. n132 It is significant that only because the Corps had consulted with NMFS and other experts was it able to grant the aquaculture researchers a permit. n133 Indeed, a PEW Oceans Commission Report advised that although the Corps "has [\*707] taken the lead in regulating offshore facilities ... under the Rivers and Harbours Act of 1899 and the Outer Continental Shelf Lands Act[,] ... [it] does not have a clear environmental mandate under those Acts, and lacks expertise to fully weigh ecological impacts in marine ecosystems." n134

3. Challenges to NOAA's Authority to Regulate Offshore Aquaculture

NMFS and its parent agency NOAA have perhaps the clearest statutory grant of authority to regulate offshore aquaculture. The Magnuson-Stevens Fisheries Conservation and Management Act ("MSA") grants NMFS the authority to regulate and manage commercial fisheries in federal waters. n135 The Act established eight Regional Fishery Councils, made up of NMFS regional directors, state fisheries officials, and individuals knowledgeable about fishery conservation, to formulate regional Fishery Management Plans ("FMPs") - legally enforceable conservation and management regulations - to carry out the Act's objectives. n136 NMFS evaluates and approves each FMP to comply with the conservation and management standards set forth in the MSA. n137

Under the MSA, NOAA asserts that it may regulate aquaculture in federal waters as an activity related to fisheries. Indeed, it has publicly recognized "its and NMFS' responsibility as experts in fisheries to oversee aquaculture's impact on the marine environment." n138 Acting on this authority, NOAA promulgated a National Aquaculture Policy in 2011 that set guidelines for Regional Fishery Councils choosing to include aquaculture activities into their FMPs. n139 However, NOAA's authority to regulate aquaculture in federal waters rests upon whether aquaculture is indeed considered a "fishing activity" under the MSA. n140 NOAA has long held the position that "fishing" encompasses aquaculture under the Act: in 1993 its general counsel issued a memorandum asserting that because the MSA's "broad" definition of "fishing" includes the "harvesting of fish," [\*708] aquaculture facilities in the EEZ are subject to the MSA. n141 Unfortunately, this opinion has not been endorsed by any congressional declaration and may not survive judicial scrutiny. n142 In fact, Congress specifically excluded "aquaculture" from the Act's 2007 reauthorization. Those opposed to NOAA's regulatory authority have publicized this detail: in response to the publication of NOAA's National Aquaculture Policy, one critic noted, "Inherent in NOAA's new policy is the agency's intention to advance aquaculture under the [MSA], our paramount fishing law. But as any fishermen will tell you, aquaculture is not fishing." n143 Another critic declared, "Proceeding with permitting that relies on the authority of the [MSA] is to cling to a legal fiction: that aquaculture is fishing." n144 Even representatives at NOAA believe that using the MSA to regulate aquaculture is "like fitting a round peg in a square hole" due to the MSA's heavy emphasis on regulating traditional commercial fisheries. n145

Indeed, despite the widespread belief that NMFS and NOAA are best suited to regulate aquaculture in federal waters, their regulatory authority has been challenged in court several times over the past few years. In 2009, NOAA allowed the Gulf of Mexico Regional Fishery Council to amend its FMP to permit commercial aquaculture in its region's federal waters. n146 [\*709] Environmentalists and fishing groups sued NOAA in federal court, arguing that the plan violated substantive provisions of the MSA, and that the decision to allow the plan to take effect was beyond NOAA's power under the MSA. Specifically, they claimed that aquaculture facilities in the Gulf would hurt both their personal and commercial interests by damaging the marine ecosystem and harming wild fish populations. n147 The court dismissed the case on ripeness grounds: because aquaculture had not yet taken place in the Gulf of Mexico pursuant to the plan, the claims were not ripe for judicial review. n148 However, the court noted, once NOAA took any action implementing the plan - that is, once an aquaculture project was actually permitted and constructed - the plaintiffs could sue to have the project and plan enjoined under the MSA. n149

Two years later, this very situation occurred. In 2011, NMFS issued the nation's first commercial fishing permit to Kona Blue for an aquaculture facility located in the federal waters off of Hawaii. The one-year "Special Coral Reef Ecosystem Fishing Permit" authorized Kona Blue to "stock, culture, and harvest" around two thousand almaco jack fish in a brass-link mesh cage that would be continuously towed behind a vessel. n150 One month after the permit's issuance, a native Hawaiian organization and a national consumer-safety watch group, KAHEA and Food & Water Watch, respectively, challenged the permit in federal court. n151 They argued that NMFS lacked authority to issue the permit under the MSA - that "although [NMFS] may properly issue such permits authorizing "fishing,' [Kona Blue]'s project involves aquaculture, which is not fishing under the MSA." n152 Furthermore, they argued, the Western Pacific Regional Council had not amended its FMP to allow for aquaculture activities, and even considered aquaculture to be one of seven nonfishing related activities, n153 meaning NMFS exceeded its authority under the MSA in issuing the fishing permit. Plaintiffs also argued that NMFS made a de facto rule that aquaculture is fishing under the MSA, in violation of the MSA and the Administrative Procedure Act ("APA"), and that NMFS violated NEPA by [\*710] failing to prepare an environmental impact statement. n154

The District Court of Hawaii disagreed with the plaintiffs' arguments and in 2012 granted summary judgment to NMFS. The court explained that under the APA, it may only set aside the agency's issuance of the permit if the decision was "arbitrary and capricious, an abuse of discretion, or otherwise not in accordance with the law." n155 The court concluded that NMFS' determination that Kona Blue's project fell under MSA jurisdiction was not "arbitrary or capricious." Rather, it was entirely reasonable for the NMFS to conclude that Kona Blue's project, which allowed for the "stock, culture, and harvest" of jack fish, was encompassed by the MSA's "broad" definition of "fishing," which includes the "harvesting of fish." n156 Furthermore, the court agreed that the expansive reading of the MSA to cover more than traditional line-fishing activities did not contravene congressional intent, citing Congress's decision to include in the MSA's definition of "fishing" "any operations at sea in support of, or in preparation for" fishing n157 and a 2010 federal court decision holding that "the laying of lobster traps without bait" was considered "fishing" under the MSA. n158

Finally, the court rejected the argument that the Western Pacific Regional Council's reference to aquaculture as a "non-fishing related activity" in its FMP meant that the Council believed aquaculture to be beyond the scope of the MSA. Rather, the court explained, "Plaintiffs [took] that statement out of context." n159 When the Council referred to aquaculture in its FMP, it was not seeking to define "aquaculture" or to "affect whether or how "aquaculture' could be regulated," but rather included it in "a section addressing impacts that may adversely affect a fish habitat." n160 Indeed, the court noted, "There [was] no indication that the Council intended to say that everything listed as "non-fishing' in that section was categorically outside the MSA's broad definition of [\*711] "fishing.'" n161 Therefore, NMFS did not exceed its regulatory authority on these grounds.

While KAHEA v. National Marine Fisheries Service may appear to give NMFS solid authority to regulate future offshore fish farms, the debate is far from over. First, the KAHEA plaintiffs will not lightly abandon their crusade to end aquaculture activities: both Food & Water Watch and KAHEA have a long history of challenging aquaculture operations. n162 Secondly, the federal court in KAHEA did not expressly declare that any aquaculture activity is subject to NMFS regulation under the MSA. Instead, it issued summary judgment to NMFS because "NMFS' characterization of the [Kona Blue] project as "fishing' was not arbitrary, capricious, an abuse of discretion, or otherwise contrary to law." n163 It is still possible that a different aquaculture project might not so easily fall within the definition of "fishing" under the MSA, in which case NMFS indeed would exceed its authority in attempting to regulate it. In fact, many of the Regional Councils have expressly classified aquaculture as a nonfishing activity in their regional FMPs. n164 Thus, under the current MSA, the notion that "aquaculture should be at some times and some places classified as "fishing' and at others as "non-fishing'" n165 casts further doubt on NMFS' regulatory authority under the Act.

Finally, not even NMFS believed that the Kona Blue permit would contribute to the development of the offshore aquaculture industry. In the report n166 it published before issuing the fishing permit to Kona Blue, NMFS agreed that the project would not "hasten the development, approval, and implementation of industrial-scale ocean aquaculture." n167 Rather, in response to comments from the public expressing concern that the permit "would open NMFS to a flood of applications for permits by operators wishing to undertake oceanic aquaculture in federal waters across the nation," the NMFS assured that it found "no evidence to support the concern expressed that there [would] be a nationwide rush to permit [\*712] aquaculture activities using fishery permits." n168 It explained that Kona Blue's project represented "the rare circumstance" where the applicant could demonstrate "the requisite experience" for harvesting fish and emphasized that the permit was "a one-time-permit limited in both scope and duration." n169 It concluded,

There is no evidence to conclude that approval of the current permit would have a cumulative effect of speeding up the approval of larger-scale projects. Each application would need to be coordinated in accordance would the permit process, and would need to comply with all applicable laws including project-specific environmental review. n170

As discussed in Part III.A above, there are quite a few "applicable laws" dealing with offshore aquaculture, and an applicant wishing to comply with all of them faces a confusing and costly road. Thus, although KAHEA affirms NMFS' authority to issue this specific one-year fishing permit to this particular offshore aquaculture applicant, it does not represent a definitive victory for NMFS' ability to regulate all aquaculture activities in federal waters.

In sum, as long as there remains no clear regulatory framework for offshore aquaculture operations, regulation will proceed in a disjointed and unsatisfactory way. Some aspects of the industry will be subject to duplicative requirements and rules, while other aspects will fall through the cracks and significant environmental impacts will be left unaccounted for. At the same time, aquaculturists wishing to expand offshore will be deterred by the lack of any predictable and consistent regulation and will have to defend their operations through ad-hoc litigation. Regulatory gaps and uncertain legal bases for authority will allow opponents of the aquaculture industry to effectively challenge any project.

#### \*\*\*Domestic aquaculture starts ups are being driven away from federal waters to other countries

Frezza, 12 --- fellow at the Competitive Enterprise Institute and a Boston-based venture capitalist (11/26/2012, Bill, “Regulatory Uncertainty Drives Fish Farmer to Foreign Waters,” <http://www.realclearmarkets.com/articles/2012/11/26/regulatory_uncertainty_drives_fish_farmer_to_foreign_waters_100008.html>, JMP)

Yet farmed fish still carries a bad rap, both from environmentalists concerned about the pollution caused by on-shore and near-shore farms, and from food snobs who favor the more robust taste of wild caught fish.

Enter a firm called Open Blue, a novel deep-water fish farm founded by entrepreneur and lifetime fish fancier Brian O'Hanlon. Brian figured that if he could solve the technology and logistics problems required to anchor a fish farm 10 or 20 miles offshore, where swift currents carry away and disperse the waste produced by concentrated fish stocks, it would allow the farmed fish to swim in the same fresh water as their wild cousins-the best of both worlds.

Open Blue farms a fish called Cobia, also known as black salmon, ling, or lemonfish. It's a tasty, fast-growing species especially amenable to being raised under controlled conditions. The economics are compelling-a mere 1.85 pounds of feed can yield a pound of Cobia. Compare this to the 2:1 ratio for poultry and anywhere from 5:1 to 20:1 for cattle, not to mention the thousands of gallons of water it takes to grow a pound of beef.

It took a while to figure out the proper siting, anchoring, and operating parameters required to run a fish farm so far from shore, but Brian, like any dedicated entrepreneur, was persistent. Resistance from local fishermen slowly turned into support when they realized they could get steady work delivering feed and materials to the farm sites while transporting harvested fish back to shore on a scheduled basis. But where did Brian set up shop, and why?

Panama. The reason? Regulations.

"Panama has a small and limited government, which made it easier to navigate the business and permitting process," explained Brian. "Deep water fish farming is so new that we wanted to work with agencies that were responsive and flexible. This was just not possible in the U.S."

Getting the required permits and licenses to operate a deep-water fish farm in the U.S. would require running the gantlet of dozens of federal and state regulatory agencies, some with overlapping jurisdictions and none with a mandate to lead the process. Agencies would include the Environmental Protection Agency, Army Corps of Engineers, Fish and Wildlife Service, Food and Drug Administration, and National Oceanic and Atmospheric Administration (NOAA). Regulations that would have to be complied with include the Magnuson-Stevens Fishery Conservation and Management Act, Jones Act, OSHA rules, and who knows how many others. Regional Fishery Management Councils and various state agencies involved in historic preservation and tourism would all have a say.

And all of this is before the courts get involved. Setting up deep-water fish farms in the U.S. would require a hefty budget for defending against lawsuits from NIMBY (Not In My Back Yard) activists and competing on-shore and near-shore fish farms, as well as paying an army of lobbyists to fend off opposition from states like Alaska and Maine where fishing fleet interests have considerable political pull. The cost and uncertainties introduced by dysfunctional crony capitalism, pay-to-play politicians, and misguided environmental activists would be deadly to any entrepreneur.

Hence Panama, which is great for Panamanians, as they get the jobs, the fish, and the export revenue, but not so great for us. Which is a shame, because the U.S. has the largest federal water zone in the world, with more ocean area suitable for deep-water fish farming than the country has arable land area. Different fish would have to be selected suited to the water temperature and conditions found in different regions, but there is no reason why you couldn't grow Cobia in the Gulf, striped bass up the mid Atlantic Coast, cod and halibut as far north as Maine, and a wide variety of species in the vast stretch between southern and northern California. That is, if anyone in their right mind would dare to start a business like this in California.

#### Reliance on seafood imports will wreck the domestic seafood industry which is key to the overall economy. The only suitable alternative is self-sufficient national production.

Corbin, 10 --- President of Aquaculture Planning & Advocacy LLC (May/ June 2010, John S., Marine Technology Society Journal, “Sustainable U.S. Marine Aquaculture Expansion, a Necessity,” ingentaconnect database, JMP)

WHY U.S. MARINE AQUACULTURE DEVELOPMENT IS IMPORTANT

Seafood Consumption in America Today

Americans have a growing preference for including seafood of all types in their diets (Johnson, 2009). The U.S. population increased from 225 million in 1980 to 302 million in 2008. During that time period, per capita seafood consumption3 increased 28% overall and 49% for the fresh and frozen product forms (Table 1) (National Marine Fisheries Service [NMFS], 2009a). A recent seafood survey showed that 65% of U.S. households purchased seafood for at-home consumption at least once in the previous year, whereas 83% of households purchased seafood in a restaurant (NMFS, 2009b).

Fully 60% of all seafood products sold were in the fresh and frozen forms (National Fisheries Institute, 2009). Studies show that Americans are seeking the fresh product form, with 43% of households purchasing fresh seafood products each year (Frey, 2008). The top 10 freshwater and marine species eaten in 2008 on a per capita basis were shrimp, canned tuna, salmon, pollack, tilapia, catfish, crab, cod, flatfish, and clams (National Fisheries Institute, 2009). Notably, three of these species have substantial global marine aquaculture production bases, that is, shrimp, salmon, and clams (NMFS, 2009a). Moreover, growth in per capita consumption in recent years occurred almost exclusively among the aquacultured species (Anderson and Shamshak, 2008).

A significant number of consumers eat seafood at the high-end, white table cloth restaurant segment of the food service industry. Although not all serve seafood, the National Restaurant Association (2009) numbers commercial establishments at 945,000 nationwide, with 2009 sales at $566 billion. U.S. consumers spent an estimated $46.8 billion in 2008 for fishery products in food service establishments (restaurants, carryouts, caterers, etc.). A substantial number of consumers also purchase products from traditional supermarket seafood counters, with the 2008 figure being $22.7 billion (NMFS, 2009a). In addition, data indicate that approximately 88% of all fresh seafood sales occur in traditional supermarkets. Fresh seafood consists of shellfish (59% of dollar value) and finfish (41% of dollar value). Both categories grew in 2007 sales, 4.6% and 3.7%, respectively, over 2006 values. More demonstrative, baseline sales for seafood suppliers grew 8% in the same period and represented 90% of seafood department dollars, indicating that consumers are buying seafood as an everyday purchase (Frey, 2008).

Seafood consumers in general represent a cross section of the population. However, recent studies have shown that older adults, that is, the 70 million maturing “baby boomers,” eat significantly more seafood than other age groups. Adults 50–64 years of age eat 35% more seafood than the national average, and adults over 65 eat 53% more. Moreover, certain ethnic groups favor seafood; Hispanics consume 24% more than non-Hispanics and represent the largest ethnic group in the United States at 38 million members (Johnson, 2009), and Asian Americans, which represent 5% of the population, have strong preferences for fresh seafood products (NMFS, 2009b).

Farmed seafood provides the food service industry and consumers in general several much sought after characteristics, including predictable and consistent supply, greater portion control, and enhanced freshness, quality, and traceability. Among the major reasons Americans are seeking out seafood today is the associated health benefits of consuming the high-quality aquatic proteins and long chain omega-3 fatty acids (eicosapentaenoic acid [EPA] and docosahexaenoic acid [DHA]) present in the products. Studies indicate that these chemicals can improve cellular function, brain, and nervous system function, and cardiovascular health (Nesheim and Yaktine, 2007). Other reasons for the increasing popularity of seafood relate to the food service industry’s development of a wide variety of value-added, easy-to-prepare seafood products and the recent supermarket trend toward self-service seafood departments supplied with prepackaged, case-ready products (Johnson, 2009).

The October 2009 survey of chefs by the American Culinary Federation further supports the trend for greater seafood consumption. The feedback on the “hottest menu trends in 2010” indicated that the top restaurant theme was purchase of locally sourced produce, meat, and seafood. Next was sustainability of production techniques to address the “greening” of the American consciousness. Also mentioned as highly popular were the seafood-related themes of using organically grown products and nontraditional fish (National Restaurant Association, 2009).

These strong indicators among food and food service providers and their customers underscore the U.S. consumer’s growing desire for sustainably and locally produced seafood. Additional evidence of seafood’s importance is the increasing use of ecolabeling by environmental and industry groups (e.g., World Wildlife Fund, the Global Aquaculture Alliance, the Marine Stewardship Council) to influence consumer behavior and to promote selection of sustainably produced seafood products (World Wildlife Fund, 2009; Global Aquaculture Alliance, 2009; Marine Stewardship Council, 2009; Anderson and Shamshak, 2008; FAO, 2009b). Further, there is a growing number of “seafood choice” cards (e.g., the Monterey Bay Aquarium and the Georgia Aquarium) to help consumers identify best and worst seafood choices based on the sustainability of the source (Monterey Bay Aquarium, 2009; Georgia Aquarium, 2009).

SEAFOOD SUPPLY IN AMERICA TODAY

Annual U.S. seafood consumption (capture and culture sources) of edible fishery products (domestic commercial landings + imports − exports = total consumption) has varied from 4.3 mmt (9,532 million pounds) to 5.7 mmt (12,492 million pounds) round weight4 between 1999 and 2008 (Table 2). The tendency was toward increasing values with 5.4 mmt (11,836 million pounds) consumed in 2008. For visual reference, a metric ton is approximately equivalent in size to a rectangle 4 feet (1.2 meters) wide, 4 feet (1.2 m) long, and 5 feet (1.5 m) high, and a million metric tons is estimated to be equivalent to 251 American football fields covered one layer deep with standard 40 feet (12.2 m) shipping containers filled to maximum load.5

Domestic commercial fishery landings also varied over the same time frame from a low of 3.0 mmt (6,633 million pounds) in 2008 to a high of 3.6 mmt (7,997 million pounds) in 2005. Notably, the United States exports significant amounts of edible seafood: values between 1999 and 2008 varied between a low of 1.9 mmt (4,129 million pounds) in 1999 to 2.9 mmt (6,462 million pounds) in 2004, with the major recipients being China, Japan, and Canada. Edible seafood imports, however, have increased every year from a low of 3.5 mmt (7,630 million pounds) in 1999 to a high of 4.9 mmt (10,763 million pounds) in 2007, until a slight decline in 2008 when the value was 4.8 mmt (10,456 million pounds) (NMFS, 2009a)

Recent reports indicate that 84% of U.S. seafood consumption is imported (NMFS, 2009b). In 2008, imports of edible fishery products were valued at a record $14.2 billion. This included 4.4 billion pounds in the fresh and frozen product forms, valued at $12.1 billion. These imports included shrimp products valued at $4.1 billion, salmon valued at $1.6 billion, and tuna valued at $601 million. Nonedible fishery products imported by the industry for fish meal, oils, etc., in the same year were valued at an additional $14.3 billion. Thus, the contribution of imports to U.S. fisheries product needs in 2008 was $28.5 billion (NMFS, 2009a).

In 2007, the United States replaced Japan, the long-time leader, as the world’s leading importer of fishery products. Notably, Japan has the highest per capita seafood consumption of any developed country at 59.3 kg (131 lb) per person or eight times that of the United States (NMFS, 2009a). Moreover, the seafood balance of trade deficit was over $10 billion in 2007, an increase of almost 60% from $6.8 billion in 1998 (ERS, 2009). Major 2008 source countries for seafood imports by volume included China 22%, Thailand 15%, Canada 13%, Indonesia 6%, Chile 5%, Viet Nam 5%, and Ecuador 4% (NMFS, 2009a).

Domestic aquaculture’s total (freshwater and marine) contribution to U.S. seafood supplies has risen, more or less steadily, in production volume from 135,747 mt (300 million pounds) in 1983 to 417,647 mt (923 million pounds), valued at $1.2 billion in 2003 (NMFS,2009a). In recent years (2004 to 2007), growth has been erratic due in large part to rising competition with lower priced foreign imports (Forster and Nash, 2008). Values ranged between a low of 362 mmt (800 million pounds) in 2006 and a high of 408 mmt (906 million pounds) in 2004, although product value has tended to increase (Table 3).

By contrast, global aquaculture production between 2004 and 2007 increased 20%, from 41.9 mmt (92.6 billion pounds) to 50.3 mmt (111 billion pounds), valued at $70 billion (NMFS, 2009a). Global aquaculture now provides 50% of edible seafood for the world population (FAO, 2009b) on the basis of the culture of more than 300 aquatic species (Leung et al., 2007). Comparatively, America was the third largest consumer of seafood in the world by volume, behind China and Japan, but has steadily dropped to 13th in volume production from aquaculture, as countries such as China, India, Thailand, Viet Nam, and Indonesia invest in expansion of their industries (FAO, 2009c). U.S. aquatic farming provided just 7.2% of domestic demand in 2007, mostly freshwater catfish and trout (National Oceanic and Atmospheric Administration [NOAA], 2008).

Focusing on the marine aquaculture component of U.S. production—mostly made up of salmon, oysters, clams, mussels, and shrimp—the annual wholesale value is around $200 million or less than 20% of the total industry value. Marine aquaculture today provides only 1.5% of U.S. seafood supply (NOAA, 2008). Seafood imports clearly dominate U.S. supplies, and estimates indicate that 50% of imports are farmed, mostly in developing countries, for example, China, Thailand, and Indonesia (NOAA, 2008; NMFS, 2009a).

Overall, this discussion indicates that the U.S. seafood economy (capture and culture products and raw materials) in total makes a significant direct economic impact on American commerce each year, even without taking into account the economic impacts of secondary industries (e.g., seafood wholesalers and retailers, transportation and storage providers, harbor support facilities providers, etc.). The total value of exported (edible and nonedible) fishery products plus the total value of imported products was $51.9 billion in 2008. From another perspective, domestic fishery landings and aquaculture production (freshwater and marine sources) had an estimated value of $5.4 billion in 2008 (NMFS, 2009a).

The contribution of marine recreational fishing to providing fish for the American diet should not be overlooked in a discussion of seafood supply. In 2008, almost 12 million anglers spent $30 billion on nearly 85 million marine recreational fishing trips on the Atlantic, Gulf, and Pacific Coasts. The total marine catch was conservatively estimated at nearly 464 million fish, of which almost 58% were released. Total harvest weight was estimated at 112,217 mt (248 million pounds), which would have had a disproportionately higher impact on the diets of residents of coastal states where the fishing activity occurred (NMFS, 2009a) and where 50% of the U.S. population lives within 80 km (50 miles) of the coast (U.S. Commission on Ocean Policy [USCOP], 2004).

It is relevant to note that of the top 10 recreational species in 2008, seven (striped bass, spotted sea trout, yellow fin tuna, red drum, dolphin fish, summer flounder, and black drum) are among the targets of public sector, private sector, and university aquaculture research or fledgling marine stock enhancement efforts (NMFS, 2009a; NOAA, 2009a). Marine stock enhancement of recreational and commercial fisheries is in the process of being recognized as a valuable tool for fisheries managers. More robust domestic coastal and ocean fisheries could add significantly to seafood supplies and expand the economy while helping preserve America’s long and cherished cultural heritage in fishing (USCOP, 2004).

PROJECTED U.S. SEAFOOD DEMAND

Global Context

Filling America’s future seafood requirements by a greater reliance on imports should be considered in the context of global seafood supply and demand projections as well as potential market forces. Aquaculture has been the fastest growing segment of world food production, expanding an average of 9% per year since 1950, although the rate has been slowing in recent years. Marine capture fisheries supplies—roughly 90% of the total supplies from fisheries, with the balance from inland fisheries—began to level off in the late 1980s at around 90 mmt (198 billion pounds) per year. Since then, virtually all increases in seafood supplies have been through expansion of freshwater and marine aquaculture, with marine farming contributing roughly 38% or 19 mmt (41 billion pounds) in 2006 (FAO, 2009b).

As the global human population grows, demand for aquatic protein will most certainly increase because of the critical contribution of seafood to the diets of the developed and developing countries around the world (FAO, 2009b). Demand projections vary with time frame and amounts, but all conclude that much more supply will be needed and future increases must come from aquaculture in all its forms. One study indicates that just to maintain current levels of worldwide per capita consumption, aquaculture will need to reach 80 mmt (176.8 billion pounds) by 2050 or 60% more than its present amount (FAO, 2003). Other estimates forecast a potential increase in world per capita consumption from 16 kg (35.4 lb) to 21 kg (46.4 lb) and 2.3 billion additional people, requiring an additional 40 mmt (88.4 billion pounds) to 60 mmt (132.6 billion pounds) from aquaculture production by 2030 (Silva, 2001). A more urgent world seafood demand projection is provided by Delgado et al. (2003), who forecast the need for between 68.6 mmt (151 billion pounds) and 83.6 mmt (184 billion pounds) from aquaculture production by 2020, which translates to between 18.3 mmt (40 billion pounds) and 33 mmt (72.8 billion pounds) more than 2007 supplies in just 13 years (NMFS, 2009a).

Importantly, these authors also question if meeting increases in supplies through greater aquaculture production is possible, with the existing trends in development, resource use, and technology intensification in the global industry (Delgado et al., 2003; FAO, 2009b). Their skepticism seems warranted upon further consideration; for example, an aquaculture production increase between 18.3 and 33 mmt in 13 years would mean an expansion of almost 1 to 1.5 times the size of the salmon industry in 2006 (volume at 1.65 mmt or 3.64 million pounds) in each of the next 13 years. A daunting task at best! Notably, the global salmon aquaculture industry took over 20 years to grow from 80 thousand metric tons (tmt) (17.6 million pounds) to 1.65 mmt in 2006 (Asche and Tveteras, 2009).

U.S. Projections

Future U.S. seafood demand has several important drivers going forward, namely, projected population growth and the continued and growing popularity of seafood as a protein choice by consumers, due in large part to trends in buying locally, seeking variety, and eating for better health.

The U.S. population is expected to grow from 302 million people in 2008 to 341 million people in 2020 and 374 million in 2030 (U.S. Census Bureau, 2009). Using the 2008 consumption value of 7.2 kg (16 lb) per person and a current national consumption figure of approximately 2.17 mmt (4,896 million pounds of edible weight2) per year as a benchmark, the necessary seafood supply just to maintain the 2008 per capita value would be 2.46 mmt (5,437 million pounds) in 2020 and 2.69 mmt (5,945 million pounds) in 2030.

Taking into account the increasing popularity of seafood, particularly among certain demographics, projected demand could be even higher. For example, the American Heart Association has advocated that Americans should eat seafood twice a week rather than the current average of once a week, and this would increase current demand by 0.68 mmt (1.5 billion pounds) (USCOP, 2004). Recent estimates indicate that by 2020, per capita consumption values could increase from 7.2 kg (16 lb) to 8.6 kg (19 lb) (Anderson and Shamshak, 2008). The increases in population and per capita consumption could push the amount of seafood needed to 2.93 mmt (6,475 million pounds) in 2020 and 3.33 mmt (7,359 million pounds) in 2030 or 1 mmt more than today.

The American seafood production, processing, and distribution industry and its political supporters and retail customers are facing a critical choice to meet projected demand. Either expand sustainable domestic sources of seafood through greater aquaculture production and greater fisheries management, restoration, and enhancement activities or rely further on imports, largely from developing countries.

UNCERTAINTIES IN MEETING FUTURE U.S. SEAFOOD DEMAND

It is important to examine some critical issues, other than basic global seafood supply, that are related to the potential long-term sustainability and stability of the U.S. option of importing substantial amounts of seafood over the next two decades. Anderson and Shamshak (2008) provide valuable insight into the complexity, instability, and far-reaching impacts of the global seafood industry. They characterize the industry as follows:

The global seafood industry is the most complex and diverse animal protein sector, with over 800 species traded, ranging from urchins to oysters to swordfish. The industry uses harvesting technologies that date back thousands of years as well as capture and culture technologies that are among the most advanced in the world.

International trade in seafood is valued at more than twice the trade in all other meats and poultry combined.

The industry is fragmented with tens of thousands of companies spread around the world.

The industry faces the most bureaucratic and inefficient regulatory environment, relative to any other food sector.

Capture fisheries are known to waste significant resources through by-catch and inefficient processing. Moreover, the industry throughout its history has often been plagued with excess capacity, overcapitalization, and/or regulated inefficiency.

Seafood is traded in a global marketplace that lacks transparency. Accurate and timely information about prices and market conditions is difficult to obtain or nonexistent.

The authors conclude that, “All these factors result in a seafood sector which is highly volatile compared with other animal protein sectors. The factors above undermine efficiency, market planning, and market development.”

In addition to the potentially disruptive factors mentioned above, which are likely to continue for the foreseeable future, there are other important reasons why maintaining U.S. accessibility to adequate seafood imports may be viewed as a “risky proposition” over the long term. Strategically, the important supply question is: Could the adequacy of seafood supplies from imports, in what already is a volatile global marketplace, be jeopardized by the anticipated increases in regional competition for product, the growth of mega cities in seafood source regions, China’s dominance in the seafood trade, and the increasing likelihood of unforeseen geopolitical events and disputes?

Fishery products are essential commodities for both developing and developed countries, and regional competition for seafood sources can be expected to increase in the decades to come. Per capita aquatic protein consumption globally has been rising the last few decades, with estimates for 2006 at 16.7 kg (35.9 lb). Importantly, fish today provide more than 3 billion people with 15% or more of their annual animal protein consumption (FAO, 2009b).

Developing countries in the Asia-Pacific region accounted for approximately 79% of global fishery production in 2006 (capture and culture sources), and this value is expected to increase with time (FAO, 2009b). Japan, the United States, and the European Union are the major markets for their exports, with a significant total market share of 72% of the total 2006 value. With respect to aquaculture production alone, the Asia-Pacific region today produces 90% of the farmed food and 80% of the world value. The region’s dominance as a critical supplier of cultured products is expected to continue well into this century (FAO, 2009b).

Several emerging trends in Asia could direct seafood supplies away from the export channels to the United States, that is, create a more competitive regional environment for products. The majority of the world’s population increase in the next 20 years will occur in the Asia-Pacific region, and it is anticipated that the regional cultures at all levels of the economic spectrum will maintain their preferences for seafood; for example, per capita consumption amounts in higher income countries are expected to continue to grow. Rising standards of living, increasing incomes, and diversification of diets in selected parts of the region are expected to maintain and/or expand demand for seafood (FAO, 2009b). To illustrate, Asian countries, other than China, experienced an increase of 5.9 kg (13.0 lb) in per capita consumption between 2003 and 2007 (Johnson, 2008).

Another notable trend that will modify dietary patterns and influence the global distribution of seafood is the urbanization of the world population, that is, the movement of people into megacities located in Europe, Asia, Africa, and North and South America. In 2008, a milestone was reached when more of the world’s population lived in cities than in rural environments. By 2050, the urban population will double from 3.3 billion in 2007 to 6.4 billion or two thirds of the total projected world population of 9.2 billion. The majority of the growth will be absorbed by cities in lesser developing countries (FAO, 2009b).

City dwellers are projected to have greater wealth, increased dietary choices, and improved ability to pay for what they want. Further, as noted by FAO, efficiently providing quality fresh products to these urban markets usually requires production capacity being relatively nearby (FAO, 2009b). A scenario can be envisioned where regional aquaculture producers and fishers will want to preferentially serve markets in the megacities rather than serve distant export customers with lower value frozen products. This presumption is supported by recent U.S. import statistics that indicate over 75% of fish products entered the country frozen and from as far away as Asia, while fresh fish came from nearby countries in the Western Hemisphere (ERS, 2009).

The Peoples Republic of China’s rapid transition to a market-based economy has been extraordinary. The country’s focus on modernization and increasing world trade has made it the most influential nation in Asia and an important trading partner for American industry. China also has become a holder of significant amounts of U.S. currency (foreign exchange reserves) and national debt, both highly sensitive political issues (Naisbett and Naisbett, 2010).

With respect to fishery products and seafood, China has become a dominant player in world markets, and the country will have a major, long-term influence on the production and distribution of seafood around the world (Johnson, 2009). Consider these statistics about China and the global seafood industry:

China was the largest producer of fisheries products in the world in 2006 with a total of 46 mmt: 14.7 mmt (32.5 million pounds) from capture and 31.4 mmt (69.4 million pounds) from aquaculture. Total fishery products production is over six times the next leading country, India (NMFS, 2009a).

China is the global leader in aquaculture production, supplying 67% of the world supply of fish and shellfish in 2006 and 49% of the value.

From 1970 to 2006, China’s aquaculture production increased at an annual average of 11.2%. However, recently the growth rate has declined to 5.8% from 17.3% in the 1980s to 14.3% in the 1990s.

Since 2002, China has been the world’s largest exporter of fish and fishery products, valued at $9.3 billion in 2007 (FAO, 2009b).

With respect to China’s growing direct influence on the U.S. seafood industry, consider these reported data (NMFS, 2009a):

Over the period 1998 to 2007, U.S. imports of fish and seafood from China increased from $289.5 million to $1.5 billion.

In 2008, China accounted for 22% of edible and nonedible fishery imports, valued at $4.1 billion.

In terms of edible fishery products imported in 2008, China accounted for over 523,000 mt, valued at $2.2 billion.

China received 19% of all U.S. fisheries product exports (edible and nonedible) valued at $2.5 billion.

With China’s fundamental importance to global seafood supply and demand, not only to feed itself but also to supply major importing countries like the United States, it is disturbing that the United Nations FAO—the keeper of world fishery and aquaculture statistics—lacks confidence in China’s fishery statistics, particularly for aquaculture production. FAO stated in 2009, “There are continued indications that capture fisheries and aquaculture production statistics for China may be too high and the problem has existed since the early 90s.” Chinese officials have recently indicated they are working to revise downward fishery and aquaculture statistics; for example, in 2008 China reported reduced total fishery and aquaculture production for 2006 of more than 10% (FAO, 2009b). These glaring uncertainties have serious implications for the predictability and stability of future seafood imports to the United States.

Finally, the world’s seafood importers are largely supplied by developing countries that are inherently more vulnerable to the geopolitical events and bilateral and multilateral disputes common today. To underscore the inherent fragility of supplies, it is estimated that up to 75% of global aquaculture production comes from millions of small-scale farms, with the majority located in Asia (FAO, 2009a). Further, concerns currently exist that although Asian production has rapidly expanded, regulatory standards that ensure a basic level of compliance with feed additive usage are lagging behind; that is, small farmers are often not aware of common food safety issues (Tan, 2009). For example, in 2007 the U.S. Food and Drug Administration announced broader import controls on all farm raised aquatic products from China due to residues from drugs not U.S. approved (OCA, 2009).

The FAO lists just some major recurring issues that can impact international trade in fishery products as follows (FAO, 2009a): (1) introduction by buyers and international retailers of private standards for food safety and quality, animal health, environmental sustainability, and social purposes; (2) trade disputes, for example, shrimp, salmon, and catfish.; (3) use of ecolabels and certification requirements by retailers; (4) expansion of regional trade areas and regional and bilateral trade agreements; and (5) rising energy prices and their impact on fisheries and aquaculture.

In summary, the inevitable geopolitical tensions over national self-interest and global financial markets, trade, energy, human rights, and national security issues, et al., could frequently and substantially disrupt the flow of future seafood imports into the United States, with rapid and lasting negative consequences to the multibillion dollar, nationwide seafood economy.

Futurists, such as Lester Brown, point to global food security as the weak link in successfully feeding the world’s growing population. He states, “Food security will deteriorate further unless leading countries collectively mobilize to stabilize population, stabilize climate, stabilize aquifers, conserve soils, and protect cropland” (Brown, 2009). The inescapable conclusion is that future U.S. imports are vulnerable to major disruption as the world negotiates the challenges of achieving a sustainable 21st century society, given the importance of international trade in seafood; the questionable ability for Asian countries, particularly China, to meet production projections; the growing pressures on the flow of products in global supply networks; and the dependency of developing countries on seafood for basic aquatic protein. Increased seafood security, defined as self-sufficiency to maintain adequate supplies for domestic use, should be targeted as a critical policy issue for helping maintain a vibrant and diverse national economy, a healthy and productive ocean environment, and a robust quality of life for Americans.

CONSIDERING U.S. OCEAN RESOURCES FOR DOMESTIC SEAFOOD PRODUCTION

The U.S. Ocean Resource

On March 10, 1983, President Reagan established by proclamation an EEZ for America.6 In effect, the EEZ designation puts all living and nonliving resources between 3 and 200 nautical miles from shore under the primary jurisdiction, management, and regulation of the federal government (USCOP, 2004).

The U.S. EEZ is the largest of any nation and covers 11.7 million km2 (4.5 million square miles), about 50% more than the total land mass of the lower 48 states (Pew Oceans Commission, 2003). The area spans a diverse array of ecosystems from the frigid Arctic to tropical marine habitats in the Atlantic and Pacific oceans. The EEZ is subject to a myriad of critical uses that serve American society, including energy extraction, seafood harvesting, marine transportation, national defense, ocean recreation, and marine conservation. Although all these uses are highly significant, its enormous size and great habitat diversity suggest that there are ample resources and space to enhance existing uses and, through proper planning and siting, develop critical new uses for society, for example, wind energy and open ocean aquaculture (USCOP, 2004).

Both state marine waters, which encompass an estimated additional 84,000 km2 (32,500 miles2), and the EEZ are essential to the future of domestic seafood supplies for America. In 2008, fishery landings for edible and industrial products were 3.8 mmt (8.4 billion pounds) valued at $4.4 billion. Economic benefits of landings impact the Atlantic, Pacific, and Gulf coasts as well as Hawaii and the U.S. territories and flag islands. For example, Alaska led all states in value of landings with $1.7 billion, followed by Massachusetts at $400 million, Maine at $288 million, Louisiana at $273 million, and Washington at $250 million. There are 50 major U.S. ports where commercial fishery landings are significant, moving product volumes of between 4,545 and 455,000 mt (10 million and 1 billion pounds) that are valued at between $10 million and $300 million per year. These ports are located in 16 of 26 U.S. states and territories with ocean coasts. Moreover, the living resources in the EEZ were the source in 2008 for approximately 65% of all fishery landings in the United States (NMFS, 2009a).

Currently, domestic marine aquaculture contributes less than 1.5% of U.S. seafood consumption, and all production comes from coastal land sites and nearshore sites in state marine waters (Forster and Nash, 2008). The United States has no commercial open ocean farms in the EEZ at this time primarily because of the lack of a permitting process and leasing regime to grant and administer the property rights needed for the private sector to invest in offshore fish farming (Cicin-Sain, et al., 2005; NOAA, 2008). As other nations with ocean coasts (e.g., England, Ireland, Norway, and China) but less resource potential actively move commercial marine aquaculture into the open ocean (Ryan, 2004; James and Slaski, 2006; Watson and Drumm, 2007; FAO, 2009b), America has remained hesitant to move forward. This despite conservative estimates showing that less than 500 km2 (less than 0.01% of the U.S. EEZ) could produce up to 600,000 mt (1.33 billion pounds) or more of additional seafood (Nash, 2004). Marine aquaculture proponents today highlight the huge size and incredible habitat diversity of the EEZ that offer a great opportunity to farm a wide range of economically important marine species for domestic markets and export (Nash, 2004; USDOC, 2007; Forster, 2008).

FEDERAL AND CONGRESSIONAL EFFORTS TO EXPAND MARINE AQUACULTURE DEVELOPMENT

In 1999, the NOAA of the USDOC spearheaded efforts to expand the marine aquaculture industry and particularly to allow commercial farming in the EEZ. These efforts were catalyzed by an ambitious policy adopted by USDOC that framed the need and potential for aquaculture to contribute significantly to domestic seafood supplies by 2025 to include the following: (1) increase the value of domestic aquaculture production (freshwater and marine) from $900 million annually to $5 billion; (2) increase the number of jobs in aquaculture from 180,000 to 600,000; (3) enhance depleted wild fisheries stocks through aquaculture, thereby increasing the value of both commercial and recreational landings and improving the health of U.S. resources; and (4) increase exports of aquaculture goods and services from $500 million to $2.5 billion annually (USDOC, 1999).

Over the period 2004 to 2008, a national dialogue on ocean use and policy ensued, largely prompted by publication of comprehensive reports by the independent Pew Oceans Commission in 2003 and the USCOP in early 2004, followed by the Bush Administration’s U.S. Ocean Action Plan in December 2004. Important components of these discussions focused on the future of fisheries and the role of marine aquaculture in domestic seafood production and included a need for a lead federal agency for sustainable marine aquaculture, a designation of the USDOC with primary responsibility to ensure offshore aquaculture develops in an environmentally sustainable manner, and introduction by the Administration of the National Offshore Aquaculture Act of 2005 (S. 1195, although hearings were held in 2006 the bill did not pass), a preparation of a 10-year plan for the NOAA Aquaculture Program in 2007, and a submission of another offshore aquaculture bill, entitled “The National Aquaculture Act of 2007” (H.R. 2010 and S. 1609), but again after hearings in 2008, the bill did not pass (USCOP, 2004; Bush Administration, 2004; USDOC, 2007).

Real progress in national legislation to encourage commercial development has been limited. However, the constraints to and the opportunities for marine aquaculture were fully described, and a large community of stakeholders became better informed.

With President Obama’s election and the appointment of a new Administration in 2009, marine aquaculture and ocean farming in the EEZ are again topics of discussion. The President began developing an ocean agenda and appointed an Interagency Ocean Policy Task Force on June 12, 2009, charged with rapidly formulating a national policy for the ocean, the coasts, and the Great Lakes. Specifically, the task force was mandated to develop recommendations for a framework for improved federal policy coordination and an implementation strategy to meet objectives of a national ocean policy, all within 90 days. Further, within 180 days, the group was to develop a framework for coastal and marine spatial planning for federal and state ocean waters and the Great Lakes to support the development of a national ocean policy (Council on Environmental Quality [CEQ], 2009a, 2009b).

On September 10, 2009, the Ocean Policy Task Force released its interim report for public comment describing a national policy, modifications to the existing governance structure and nine categories of action (CEQ, 2009a, 2009b). Subsequently, the Ocean Policy Task Force released its required report on marine spatial planning, entitled “Interim Framework for Effective Coastal and Marine Spatial Planning” on December 9, 2009, for public comment. The report outlined an innovative, stakeholder-driven process through which the federal government will carry out more integrated planning and management of activities in America’s oceans and the Great Lakes and provides an ambitious 5-year timetable. Although the initial task force report barely mentions aquaculture, the spatial planning framework lists a range of 15 social, economic, and cultural uses for consideration, including aquaculture (fish, shellfish, and seaweed farming), commercial fishing, recreational fishing, ports and harbors, and traditional hunting, fishing, and gathering (CEQ, 2009b).

It will be important to marine aquaculture to see how the 2010 Congress prioritizes and supports this new comprehensive approach to ocean management. Meanwhile, other recent national actions have focused on actively moving marine aquaculture into the EEZ and are briefly highlighted:

In 2009, the Gulf Coast Regional Fisheries Management Council developed a permit and leasing process for commercial marine aquaculture in federal waters of the Gulf of Mexico that awaits implementation after further deliberation by NOAA to establish a policy for commercial farming in the EEZ. The effort included a comprehensive Programmatic Environmental Impact Statement and Management Plan (Gulf Coast Regional Fisheries Management Council, 2009).

Legislation (H.R. 4363) was submitted in December 2009 to establish a comprehensive regulatory framework and research program for offshore aquaculture development in the EEZ that balances environmental, social, and economic concerns and focuses on establishing a regulatory system; authorizing the Secretary of Commerce to determine appropriate locations, to permit, to regulate, to monitor, and to enforce offshore aquaculture activities; requiring the Secretary of Commerce to issue regulations and permits for offshore aquaculture to prevent and/or minimize impacts on the marine ecosystem and fisheries; and establishing a research program to guide the precautionary development of offshore aquaculture (Gov. track, 2009). The legislation awaits hearings at this writing.

NOAA announced in December 2009 that it will develop a comprehensive national policy for sustainable marine aquaculture in federal waters. The policy will enable domestic aquaculture, which adds to the U.S. seafood supply, supports important commercial and recreational fisheries, develops coordinated federal standards for permitting facilities in federal waters, and formulates strategies to provide the scientific information needed for permitting decisions. Stakeholder input will be sought in 2010 (NOAA, 2009b).

CURRENT ISSUES IN U.S. COMMERCIAL OFFSHORE MARINE AQUACULTURE DEVELOPMENT

National surveys documenting the changes in the number of farms and farm acreage in the U.S. aquaculture industry between 1998 and 2005 lead to several conclusions about the potential direction of future development (National Agricultural Statistics Service, 2000, 2006). Freshwater acreage is growing slowly, and future increases in production will largely come from intensifying production on existing land-based farms rather than major site expansions and building new farms. Nearshore marine farming (mainly bivalve shellfish) is increasing rapidly, and further expansion of commercial marine aquaculture into open ocean locations offers the greatest potential for large-scale growth because of less competition for use of resources and the large area available (Corbin, 2007a). Moreover, according to the USCOP, locating aquaculture activities further offshore will reduce conflicts over the visibility of facilities from land, be less intrusive to nearshore capture fisheries and recreational activities, and have fewer environmental impacts (USCOP, 2004).

Leasing federal waters for commercial aquaculture has been a controversial subject in recent years, raising a variety of issues for discussion and consensus building among opponents and proponents. Among the most difficult to address has been the potential for negative environmental impacts of large-scale marine farming in the open ocean setting of the EEZ. The most frequently mentioned concerns by opponents include escapes of farmed species and mixing with wild populations, disease and parasite management and the potential for infection of wild populations, use of fishmeal as a major protein source in fish feeds impacting the source fisheries, and pollution potential and the need for standards for acceptable change in the quality of the water column and substrate in and around farms (Lubchenko, 2003; MATF, 2007).

The research community and the industry have made significant efforts to study these recurring concerns and how they can be successfully managed. There have been documented positive reports of negligible environmental impacts from several multiyear offshore research and commercial marine farming projects in Hawaii, Puerto Rico, and New Hampshire, with combined operating experience of over 20 years (Aquaculture Planning and Advocacy, 2009; Kona Blue Water Farms, 2009; Alston et al., 2005; Langan, 2007). Proponents believe that the results from these projects, which include comprehensive environmental monitoring (e.g., water column and substrate quality, feeding and feed conversion, stock health and escapes), and others from around the world (Ryan, 2004) support the conclusion that the potential for negative environmental impacts from offshore and open ocean aquaculture is very manageable through proper siting and farm operation (e.g., application of well-known industry best management practices). It is suggested that sufficient empirical and scientific information exists to select open ocean sites with appropriate oceanographic conditions (e.g., sufficient current for mixing and substrate for anchoring) and operate a finite number of large-scale farms to demonstrate that today’s “off the shelf” technologies and available native-to-the-region species are scalable and can be sustainably managed. For example, work by Renzel et al. (2007) and the Scottish Association of Marine Science (2009) on modeling potential site impacts of ocean farming and by Nash et al. (2005) and Rust (2007) on ecological risk management can be highlighted for guidance.

What is lacking at this stage, according to the nascent industry, is application of this information to establish a workable interim permitting and leasing process for federal waters to allow the private sector to demonstrate large-scale commercial farming in interested regions. Model processes to base an interim EEZ permitting and leasing program for cage culture have been suggested for federal waters (Cicin-Sain et al., 2005) and are operating in state waters in Maine and Hawaii, which include environmental assessment of the site, stakeholder input, and environmental monitoring plans (MDMR, 2009; Corbin, 2007b). Using properly sited demonstration farms, such as the 24-cage fish culture project being proposed by Hubbs-SeaWorld Research Institute 5 miles offshore in the Southern California Bight (MCRI, 2008), federal agencies could require monitoring and collect information from operating farms. In consultation with affected agencies, states, industry, and the affected public, this information could be used to begin the process of promulgating standardized regulatory and leasing processes and environmental requirements, while nationwide integrated spatial planning is carried out for federal and state waters. In other words, a proactive, adaptive management, and place-based planning approach could be used to move commercial marine aquaculture into the EEZ in a timely manner to address the looming U.S. seafood supply gap and make it sustainable (Corbin and Young, 1997).

CONCLUSIONS

The production, distribution, and use of edible and nonedible fisheries products are increasingly important to the expansive and diverse U.S. economy. Seafood is a multibillion dollar industry that touches a vast majority of the American population and significantly affects their quality of life. The seafood/fisheries economy impacts every state and particularly the numerous communities along the U.S. coasts. Domestic demand for seafood is projected to increase in the next 10 to 20 years, as indicated by the clear trends for increasing population, per capita consumption, and importation of products.

Currently, 84% of U.S. seafood consumption is supplied by imports, largely from developing countries in Asia, and this dependency is expected to continue and grow unless there is greater public and especially private investment (the government does not create businesses and jobs, the private sector does) into research and development to increase domestic production. Domestic supplies from commercial fisheries have, more or less, leveled off, and freshwater and marine aquaculture (mostly freshwater species like catfish and trout) have grown steadily but supply only 7% of consumption. Marine aquaculture has the most potential for large-scale expansion but currently supplies only 1.5% of domestic consumption.

Conservatively, projections indicate that the United States will need between 0.29 mmt (641 million pounds) and 0.76 mmt (1.68 billion pounds) more seafood in 2020 and between 0.52 mmt (1.15 billion pounds) and 1.05 mmt (2.32 billion pounds) more in 2030. The Administration, the Congress, and the American public can choose to continue to rely on imports or deliberately expand marine aquaculture and aquaculture-enhanced fisheries, particularly through establishing commercial farms in the EEZ and stock enhancement programs to revitalize economically important recreational and commercial marine fisheries.

Meeting projected American seafood needs largely with imports is considered a “risky proposition” over the long term, with the likelihood that growth projections for global aquaculture will not be met and the near- and long-term high volatility of the international marketplace for seafood products. Major reasons for this concern include the following:

The rapidly changing demographics in developing countries will affect global seafood distribution and consumption patterns. Increasing population and standards of living in these countries will put pressure on supply distribution channels to the United States and lead to greater regional competition for products in both developed and developing countries.

The strong urbanization trend of the world population is likely to drastically impact how seafood is distributed, as products are directed to urban population centers within regions. A scenario is suggested where regional capture and culture seafood providers will preferentially concentrate on filling nearby urban consumer preferences for high-quality, fresh products.

The dramatic rise of China as a world economic power and a major seafood producer, consumer, exporter, and importer will continue to significantly influence the flow of products in international trade. China’s unpredictable political shifts in domestic and trade policies and its questionable fisheries and aquaculture production capacity create uncertainty that it can feed its growing population and expanding middle class while maintaining its increasingly important role as exporter to the United States.

Developing countries, the predominant source of seafood supply and exports in international trade, are much more vulnerable to the recurring geopolitical events and controversies that will mark the 21st century world’s path to a sustainable future (Friedman, 2008; Brown, 2009). International financial, energy, human rights, homeland security, trade policy, food safety, and other issues can have sudden significant and lasting disruptive impacts on the international seafood trade.

America has the largest EEZ in the world, with enormous potential for developing sustainable commercial open ocean aquaculture of many economically important species. Likewise, closing the life cycles of important marine species would allow greater use of aquaculture technologies as an important tool to enhance sources of seafood from coastal and ocean capture fisheries through increased stock enhancement. With greater utilization of the EEZ, multiple use of the resource and other issues will occur and need to be resolved at the site determination stage. America’s ocean space is enormous, and conservative estimates indicate open ocean aquaculture alone could produce significant amounts of additional seafood (Nash, 2004).

The management guru Peter Drucker has suggested, “Aquaculture, not the Internet, represents the most promisng investment opportunity in the 21st Century.” (Drucker, 1999) Prompted by the recognized opportunities and several comprehensive reports on ocean policy and use, legislation has been proposed in Congress to expand marine aquaculture research and development, particularly in the EEZ. Notably, the Obama Administration has taken a broadened, multiple use approach to ocean planning, policy, and management. Marine aquaculture and fisheries are among the proposed topics for this expanded, multistakeholder discussion of planning and managing a myriad of uses of America’s oceans, particularly the EEZ.

The critical marine aquaculture development issues for stakeholder consensus building include identification of appropriate sites, control of stock escapes, disease prevention and management protocols, reduction in the use of fish meal and oil in stock diets, and development of environmental standards to control potential pollution. It is suggested that a great deal of pertinent scientific information and empirical evidence has been generated in the past 10 years that allows detailed assessment and acceptable predictability for site specific impacts of farming, hence identification of environmentally suitable sites. This database provides an informed basis for establishing an interim ocean permitting and leasing program for the EEZ that can evolve to a standardized process based on establishing and monitoring a finite number of regional commercial demonstration farms. The interim permitting/leasing effort to allow the private sector to spearhead progress should be complemented by increased federal investment in developing commercial-scale marine aquaculture technologies for cultureof species important to farming and aquaculture-enhanced marine fisheries (Browdy and Hargreaves, 2009).

Greater seafood self-sufficiency and security is required to sustainably and reliably fill America’s growing demand for seafood in a global marketplace. U.S. imports will become more sensitive to supply disruption due to increasing geopolitical tensions and major demographic and development trends in both the developed and the developing worlds. Expanding marine aquaculture to sustainably farm the sea and investing in aquaculture-enhanced fisheries management to rebuild and maintain recreational and commercial stocks can significantly increase domestic seafood supplies. It also will provide important job and infrastructure revitalization opportunities for the national economy and many coastal communities.

The inescapable conclusion to be drawn from this broad review of history, current status, and future of the U.S. seafood “oceanscape” is that environmentally sustainable, economically viable, and community-accepted expansion of marine aquaculture can and should move forward now. Industry expansion into the EEZ should not wait for completion of integrated, nationwide marine spatial planning of the ocean environment, a process which could take many years to complete. There is an urgent need for the Congress and NOAA to take action to increase domestic fish and shellfish supplies through expansion of marine aquaculture to bolster the seafood industry to satisfy its many millions of customers.

#### The impact is global nuclear war

Freidberg & Schonfeld, 8 --- \*Professor of Politics and IR at Princeton’s Woodrow Wilson School, AND \*\*senior editor of Commentary and a visiting scholar at the Witherspoon Institute in Princeton (10/21/2008, Aaron and Gabriel, “The Dangers of a Diminished America”, Wall Street Journal, <http://online.wsj.com/article/SB122455074012352571.html?mod=googlenews_wsj>)

With the global financial system in serious trouble, is America's geostrategic dominance likely to diminish? If so, what would that mean?

One immediate implication of the crisis that began on Wall Street and spread across the world is that the primary instruments of U.S. foreign policy will be crimped. The next president will face an entirely new and adverse fiscal position. Estimates of this year's federal budget deficit already show that it has jumped $237 billion from last year, to $407 billion. With families and businesses hurting, there will be calls for various and expensive domestic relief programs.

In the face of this onrushing river of red ink, both Barack Obama and John McCain have been reluctant to lay out what portions of their programmatic wish list they might defer or delete. Only Joe Biden has suggested a possible reduction -- foreign aid. This would be one of the few popular cuts, but in budgetary terms it is a mere grain of sand. Still, Sen. Biden's comment hints at where we may be headed: toward a major reduction in America's world role, and perhaps even a new era of financially-induced isolationism.

Pressures to cut defense spending, and to dodge the cost of waging two wars, already intense before this crisis, are likely to mount. Despite the success of the surge, the war in Iraq remains deeply unpopular. Precipitous withdrawal -- attractive to a sizable swath of the electorate before the financial implosion -- might well become even more popular with annual war bills running in the hundreds of billions.

Protectionist sentiments are sure to grow stronger as jobs disappear in the coming slowdown. Even before our current woes, calls to save jobs by restricting imports had begun to gather support among many Democrats and some Republicans. In a prolonged recession, gale-force winds of protectionism will blow.

Then there are the dolorous consequences of a potential collapse of the world's financial architecture. For decades now, Americans have enjoyed the advantages of being at the center of that system. The worldwide use of the dollar, and the stability of our economy, among other things, made it easier for us to run huge budget deficits, as we counted on foreigners to pick up the tab by buying dollar-denominated assets as a safe haven. Will this be possible in the future?

Meanwhile, traditional foreign-policy challenges are multiplying. The threat from al Qaeda and Islamic terrorist affiliates has not been extinguished. Iran and North Korea are continuing on their bellicose paths, while Pakistan and Afghanistan are progressing smartly down the road to chaos. Russia's new militancy and China's seemingly relentless rise also give cause for concern.

If America now tries to pull back from the world stage, it will leave a dangerous power vacuum. The stabilizing effects of our presence in Asia, our continuing commitment to Europe, and our position as defender of last resort for Middle East energy sources and supply lines could all be placed at risk.

In such a scenario there are shades of the 1930s, when global trade and finance ground nearly to a halt, the peaceful democracies failed to cooperate, and aggressive powers led by the remorseless fanatics who rose up on the crest of economic disaster exploited their divisions. Today we run the risk that rogue states may choose to become ever more reckless with their nuclear toys, just at our moment of maximum vulnerability.

The aftershocks of the financial crisis will almost certainly rock our principal strategic competitors even harder than they will rock us. The dramatic free fall of the Russian stock market has demonstrated the fragility of a state whose economic performance hinges on high oil prices, now driven down by the global slowdown. China is perhaps even more fragile, its economic growth depending heavily on foreign investment and access to foreign markets. Both will now be constricted, inflicting economic pain and perhaps even sparking unrest in a country where political legitimacy rests on progress in the long march to prosperity.

None of this is good news if the authoritarian leaders of these countries seek to divert attention from internal travails with external adventures.

As for our democratic friends, the present crisis comes when many European nations are struggling to deal with decades of anemic growth, sclerotic governance and an impending demographic crisis. Despite its past dynamism, Japan faces similar challenges. India is still in the early stages of its emergence as a world economic and geopolitical power.

What does this all mean? There is no substitute for America on the world stage. The choice we have before us is between the potentially disastrous effects of disengagement and the stiff price tag of continued American leadership.

#### \*\*\*Boosting domestic ocean aquaculture reverses the seafood trade deficit

Strasser, 14 --- Senior Editor of ThinkProgress (4/21/2014, Annie-Rose, “The New, Innovative And More Efficient Way Of Feeding People,” <http://thinkprogress.org/climate/2014/04/21/3422486/big-ag-takes-to-the-ocean/>, JMP)  
**\*\*\*Note --- Don Kent is President of the Hubbs-Sea World Research Institute**

Models are all that researchers have to go off when assessing the potential impact of increased fish farming, though. That’s because the United States is far from a leader in the industry — we’re way behind. Commercial fishing has remained stagnant while aquaculture is on the rise worldwide, but here in the U.S. we’re still importing farm-raised fish from other countries — places including China and Chile — instead of growing it ourselves. About 91 percent of our seafood originates abroad, and half of it comes from aquaculture.

Kent says that system won’t last too long.

“What’s happening on a global level is that the cost of seafood, because we keep seeing a need for more and more of it — populations are growing, people are eating more and more of it because it’s healthier for them — what’s happening is the economies in the world that are growing right now, like China, Brazil, where economies are starting to grow, their middle class is growing and their ability to buy seafood is increasing,” he explained. “And so the very countries like China that’s producing the majority of the seafood is keeping it now. So it’s becoming more and more expensive now for us to source the product here.”

Kent also argues that we should actually want to produce our own seafood here. From a regulatory standpoint, Americans can have more faith in the quality of fish produced under regulations from our own government. “We are importing all of this seafood but it’s impossible for us to check it all for all of these chemicals,” he said, “so who knows how it was really grown? But if it’s grown here, unless the farmer is being illegal in his operation, it’d be illegal to do it. ”

There’s plenty of opportunity for growing more protein from the sea here in the United States. Exclusive Economic Zones, EEZs, are the area of ocean over which a country has exclusive access to natural resources. The U.S. has the largest EEZ of any country on Earth. But we’re outsourcing our fish production instead of doing it ourselves. In 2010, the tiny country of Bangladesh — with an EEZ of a little over 78,000 square kilometers — produced 1,308,515 tons of aquaculture. The United States — whose EEZ is nearly twelve times the size — produced 495,499 tons.

“The parts of the world where they have to feed their people or they’re going to starve, like Bangladesh, they get it. They’re doing it,” said Kent. “The people in our country, where we’ll just go buy it somewhere else, are now having to learn the lesson the hard way. Because the sources are drying up. ”

#### \*\*\*Independently, the plan creates tens of thousands of jobs

Strasser, 14 --- Senior Editor of ThinkProgress (4/21/2014, Annie-Rose, “The New, Innovative And More Efficient Way Of Feeding People,” <http://thinkprogress.org/climate/2014/04/21/3422486/big-ag-takes-to-the-ocean/>, JMP)  
**\*\*\*Note --- Don Kent is President of the Hubbs-Sea World Research Institute**

But where the negative rhetoric around the corporatization of fish farming is true, so is the more positive. The industry, for example, has the potential to bring a significant number of jobs to the United States.

Don Kent says he’s done the calculations based on estimates that 1,000 tons of aquaculture produces about 40 jobs. “California has 37 million people in it,” he said from his office in San Diego. “If we grew all the seafood we needed for those people … we’d need something like a quarter million tons of seafood just for California. And figuring, when you filet the fish, you eat half and the other half gets thrown away — the bones and guts and everything — you’d actually need half a million tons of seafood. That’s 500,000 tons times 40. You’re talking about tens of thousands of jobs. Well over 20,000 jobs, just to feed our own people.”

### 1ac Sustainability Adv

#### Contention 2 is Sustainability

#### Unsustainable aquaculture practices will devastate marine environments and collapse the industry --- promoting a regulated industry will solve overfishing globally

Smith, 12 --- J.D. Harvard Law School, 2012 (4/19/2012, Turner, “Greening the Blue Revolution: How History Can Inform a Sustainable Aquaculture Movement,” <http://dash.harvard.edu/bitstream/handle/1/11938741/Smith_2012.pdf?sequence=1>, JMP)

IV. The Benefits and Harms of Modern Aquaculture

Before delving into an account of the present state and future challenges of aquaculture in the United States in Part V, this Part pauses to briefly summarize the benefits and harms of the modern aquaculture industry. This Part aims to give the reader a sense of the reasons aquaculture has, in may respects justifiably, become popular as an environmentally sustainable source for fish in modern times, and the ways in which its popularity may forecast significant deterioration to the environment and may ultimately threaten the industry’s commercial viability.

A. Benefits of Farm-Raised Fish

The sharp rise in popularity of aquaculture is in many ways well founded because of the significant benefits the industry has over capture fisheries and terrestrial sources of protein. The benefits of farm-raised fish are abundant from both nutritional and environmental perspectives.

i. Nutritional Benefits

Aquaculture has the potential to afford substantial nutritional benefits to society by facilitating access to fish, providing fresher and thus more nutritious fish, and providing an inherently healthier product through manipulation of fish environments throughout the aquaculture production process.

Because aquaculture may be practiced in areas where fisheries are absent or dwindling, such as poor inland areas and overfished coastal areas, aquaculture can provide fish protein to communities who would otherwise have none. Access to aquaculture products can provide substantial, stable nutritional benefits to inland communities, as fish contain large resources of protein, and many readily available amino acids, in comparable quantities to terrestrial protein sources like meat and milk, such as lysine, methionine, and tryptophan. 213 Nash goes so far as to claim that “[w]ith their unsaturated fats, minerals, and trace elements, all equally important to the human diet, fish and shellfish are considered to be almost as beneficial to the body as mother’s milk.” 214 In fact, fish may be healthier in many respects than terrestrial food sources, as fish oils have more polyunsaturated components than animal fats and can help to reduce the buildup of cholesterol in blood.215 The high content of n-3 polyunsaturated fatty acids contained in aquaculture products are thought to prevent cardiovascular diseases and cancers.216 Even when aquaculture facilities are not located nearby, aquaculture product can often be shipped to inland “food deserts” more cheaply, as farmed fish are generally uniform in size so no sorting is required to harvest and ship the product to processors, standard box sizes may be used, and processing steps may be automated by using machines instead of manual labor.217 Moreover, fish from aquaculture facilities are sold on the fresh fish markets more often than their wildcaught counterparts. 218 Only a third of wild-caught fish are sold as fresh products, with the remainder two thirds “preserved in some way in cans or bottles, or reduced into commercial fish meals and oils.”219

Moreover, aquaculture products can be inherently more healthful than product from capture fisheries because aquaculture facilities can control the quantity and quality of feed the fish receive, which affects the fat content, flavoring, and the color of fish products. 220 Finally, aquaculture facilities, especially closed-cycle facilities, can often control exposure of cultured fish populations to toxins like mercury, which is one of the most problematic aspects of fish consumption.221 Thus, aquaculture has substantial nutritional benefits that are potentially more significant than product from capture fisheries.

ii. Environmental Benefits

The potential environmental benefits of aquaculture are substantial, and account in large part for the surge in popularity of the industry, as delineated above. The most obvious benefit is that sustainably farmed aquaculture product can reduce demand for product from capture fisheries. In the United States, as discussed above, overfishing has become a large problem; according to the Pew Commission in 2001 30.6 percent of known wild fish stocks are experiencing overfishing or are overfished.222 To the extent that aquaculture is performed in a sustainable manner, as discussed below, it can ease pressure on wild fish stocks by continuing to supply product to satisfy a large percentage of U.S. demand for fish. Moreover, aquaculture can help natural fish populations by providing habitat for natural species in artificial wetlands created by aquaculture activities, by producing eggs, fry, and juveniles to enhance fish stocks, and by preserving biodiversity through stock-raising programs. 223

Aquaculture production also has several other substantial environmental benefits relative to other food sources. Aquaculture wastes, if handled properly, can be recycled as nutrient-dense fertilizer for agricultural products, hydroponic operations, or natural or constructed wetlands, thereby reducing the need for petroleum-based fertilizer.224 Aquaculture operations can recycle wastes from other industries, like the agriculture and capture fisheries, by using those wastes in their feeds.225 Aquaculture can benefit from heat waste from industrial plants226 and can even feed off of and cleanse human wastes. For example, fish farms in Calcutta “feed on the 600 million litres of raw sewage that spews from [the city] every day, turning a health risk into a valuable urban crop.”227 According to the World Watch Institute, “[t]he restorative potential of fish farming is vast and . . . can be harnessed to multiply eelgrass beds, mangrove seedlings, and other lost ecosystems.”228 Moreover, some nutrient effluent is actually beneficial to benthic communities, and excessive nutrient effluent can be counteracted if the fish farm facilities coexist with shellfish or seaweed culture operations, which remove nutrients from surrounding waters.229 These substantial environmental benefits make aquaculture seem like an obvious choice, especially when the alternative source of protein would be from overfished wild stocks or poorly treated, environmentally harmful livestock.230 However, nearly all of the benefits delineated above require good faith planning, monitoring, and operation on the part of facility owners and operators with an eye toward maintaining sustainable, environmentally friendly facilities; as the next section describes, though, environmentally conscious aquaculture operation is far from the norm.

B. Costs of Farm-Raised Fish

Although aquaculture became popular as a means of providing an alternative to environmentally harmful fishing practices, modern aquaculture practice itself causes substantial environmental problems, contributing to tragedies of both pollution and exploitation. This Section focuses primarily on the environmental degradation caused by modern aquaculture, though it is important to note that these environmental issues have significant effects on public health and economic welfare nationwide. As noted by the World Bank, “[t]he challenge of sustainable aquaculture is to contribute to national objectives for economic, development and food security while simultaneously addressing poverty reduction and environmental protection.”231 This Section demonstrates that effluent discharges from marine aquaculture facilities contribute to many environmental harms,232 including “[i]mpacts on water quality, the benthic layer, the native gene pool, other fisheries, and the ecosystem as a whole, as well as impacts from non-native species, disease, and chemicals.” 233 Moreover, paradoxically, aquaculture operations contribute to the tragedy of the commons by exploitation of wild fish stocks.

First, aquaculture can, and should, be conceptualized as a cause of a tragedy of the commons by pollution. 234 The most salient environmental harm caused by aquaculture in open aquatic and marine environments is impaired water quality in areas surrounding aquaculture facilities. Impairment results from effluent of nutrients from aquaculture facilities, which causes sediment organic enrichment and algae blooms, which in turn result in dissolved oxygen depletion, called eutrophication or “dead zones.”235 This waste can accumulate quickly and cause hazardous conditions, “contaminating surrounding areas and preventing sustainable life.”236

Moreover, aquaculture facilities discharge many potentially harmful hazardous and nonhazardous chemicals into the ocean, including pesticides, hormones, antibiotics, parasiticides, pigments, vitamins, minerals and anesthetics.237 The release of antibiotics into aquatic and marine environments is particularly worrisome. Antibiotics are used by aquaculture facilities to suppress disease and encourage rapid product growth.238 In the United States the Food and Drug Administration (“FDA”) has approved five drugs for treating, but not preventing, fish diseases.239 The main risks of use of antibiotics in open aquaculture facilities is “related to their release in the environment,” which “could induce the contamination of aquatic organisms” and, most notably, contribute to the growing problem of antibiotic resistance.240 The chemical additives often used in fish farms to increase farm output and to keep cages clean, including chlorine, sodium hydroxide, iodophors, and calcium oxide, may also be disruptive to marine ecosystems.241 Of course, the severity of these effects depends on complex factors such as “the technique applied, site location, size of the production, capacity of the receiving body of water, and type of species raised,” but the impacts have been felt throughout U.S. coastal areas. 242

Another serious environmental problem caused by the aquaculture industry is genetic change in indigenous fish populations due to interbreeding with escaped farm fish. 243 Farm-raised fish are often different in genetic make-up than the natural populations of fish that live in nearby or contiguous waters, because fish in aquaculture facilities often interbreed and aquaculture operators often selectively breed fish to produce a better product.244 This means that the “inevitable escape” of fish can result in degradation of the natural species, if the escaped fish are able to breed with the natural populations.245 By one account, as many as forty percent of Atlantic Salmon caught in the North Atlantic originated on fish farms.246 The development of genetically modified fish may make this issue even more serious. Even though the genetically modified fish currently under review by the FDA, the AquAdvantage® Salmon, is designed to be sterile, the effective sterility rate is not quite 100%, leaving room for a “Trojan fish” to infiltrate natural populations if ever released into aquatic or marine environments.247

Apart from genetic transmission, improperly operated and maintained aquaculture facilities may also cause disease and parasite (sea lice) transmission between wild and domestic populations because “crowding, temperature fluctuations, [and] inadequate dissolved oxygen” stress the species, weakening their natural defenses to disease.248 Outbreaks of diseases and parasites have occurred in this country and abroad, with devastating effects on both culture and wild fish populations,249 raising serious economic, environmental, and animal welfare concerns. 250 Pollution of the product itself can also be a problem. For example, many farmed fish are carnivorous and eat smaller, wild-caught fish. The fish meal and fish oils in feed used on fish farms for carnivorous fish like salmon is made of fish from the open sea and thus often contain contaminants like persisting organic pollutants, polycyclic aromatic hydro-carbons, and heavy metals like mercury as these toxins accumulate in the natural aquatic or marine food webs.251 Thus, “aquaculture could be considered as a further step of accumulation of environmental contaminants compared to wild products,” eliminating one of the most important nutritional benefits of aquaculture over wild-caught fish: the absence of heavy metals.252 Moreover, use of fertilizers recycled from other industries, like chicken manure, can contaminate aquaculture product with pathogens like salmonella.253 Thus, aquaculture operations can be a source of serious degradation of local, regional, and national environmental and public health commons by pollution.

Second, aquaculture can, and should, be conceptualized as a contributor to the tragedy of the commons by exploitation.254 While aquaculture arose in part to ameliorate overfishing, it has, ironically, begun to contribute to the problem because many of the most in-demand aquaculture products are carnivorous fish.255 Catching fish to raise fish not only contributes to the pollution problems described above, but also contributes to the exploitation problems of capture fisheries.256 In fact, many commercial aquaculture systems use two to five times more fish protein to feed the farmed species than is supplied by the farmed fish at the end of the aquaculture production cycle.257 While some argue that farmed fish production is still more efficient than the production of carnivorous species in the wild, it is still the case that modern aquaculture still does not wholly solve the exploitation problem.258 Moreover, habitat modification caused by siting of aquaculture facilities, including destruction of mangrove spawning habitats, has contributed to the depletion of wild fish stocks, and aquaculture operations often stock facilities with wild-caught fry, rather than cultured fry, removing those fish from the wild and resulting in discard of large amounts of wild bycatch.259

Thus, aquaculture has become a tragedy of the commons in many respects. Aquaculture has polluted coastal commons at the local, regional, national, and global scales through effluent of nutrients and a variety of chemicals and through genetic and disease transmission. It has also, somewhat paradoxically, exploited the global marine commons through fishing for feed and fry, as well as habitat modification for aquaculture siting. As the industry moves into the twenty first century, it must acknowledge and act to mitigate its contribution to problems of pollution and exploitation so that it can realize its full potential as both an independent, commercially viable industry and a solution to the increasing problem of overfishing worldwide.

V. Present and Future of Aquaculture in the United States

The present status of aquaculture is at once cause for hope and for concern. The aquaculture industry in large part arose to address the problems of one type of tragedy of the commons, exploitation in the form of overfishing,260 and has arguably been successful in mitigating this tragedy in some areas of the world. However, aquaculture itself has quickly led to tragedies of the commons by pollution in the form of various types effluent to inland and marine water bodies and, further, by exploitation of wild fish populations for fish feed and facility siting.261 Unfortunately, without proper regulation, aquaculture is doomed to create a new set of complex problems as it seeks to mitigate others. While the detrimental environmental impacts of foreign fish farming may justify the expansion of the U.S. industry, where environmental protections could be greater, it is still crucial to steer aquaculture away from likely tragedies of the commons to protect the regional commons of our inland water bodies and coasts.262 This Part briefly describes the current and predicted future trends and challenges of aquaculture production and the complexity and inadequacy of the current regulatory framework for aquaculture production in the United States in light of these trends and challenges.

A. Present and Future Trends and Challenges in Aquaculture Development

Aquaculture has become a blue revolution: its growth has wildly exceeded industry and consumer expectations. In the 1990s, forward projections “look[ed] to global totals of production from aquaculture reaching as much as 50 million tonnes within another 25 years,” in other words, by approximately 2020.263 By 2010, however, 115 million tons of fish were used as human food, with aquaculture accounting for forty six percent, or 52.9 million tons, of aquaculture production.264 Thus, by 2012, aquaculture production had already exceeded growth levels expected for the following decade. Similarly, K.M. Brander, in his 2004 article in the Proceedings of the National Academy of Sciences predicted that whereas sixty eight percent of production of fish, crustaceans, and mollusks in 2004 came from capture fisheries and the remaining thirty two percent came from aquaculture, “[a]quaculture production is rising rapidly, and by 2030 it is estimated that aquaculture production will be close to that of capture production.”265 In 2011, just seven years later, the FAO made a stunning announcement: “by 2012 more than 50 percent of global food fish consumption will originate from aquaculture.”266 Thus, aquaculture has experienced dramatic increases, exceeding most expectations, in the last several decades.

In the United States, specifically, marine aquaculture now occurs in every coastal state.267 However, imports satisfy the ever-increasing domestic demand for seafood.268 According to the FAO, the United States ranks 13th in total aquaculture production behind China, India, Vietnam, Indonesia, Thailand, Bangladesh, Norway, Chile, Philippines, Japan, Egypt, and Myanmar.269 The United States’ domestic shortage poses a threat to the nation’s food security and increases the nation’s dependence on foreign natural resources.270 It is also a problem for the environment, as many other nations have far less stringent environmental regulation than the United States’ patchwork of regulatory efforts.

Predicted trends for aquaculture in the United States are highly variable, but generally assume that the industry will continue to meet growing demand for seafood products.271 The reasons for this predicted expansion are multiple. The U.S. population is expected to grow by fifty-two million people by 2025, with seafood demand expected to rise by 416,000 tons or more, given recent pressure from the FDA on the public to consume more fish products because of the health benefits associated with fish consumption.272 This demand will have to be filled by aquaculture because global capture fisheries, the majority of which are currently fully exploited or overexploited,273 are expected to continue their steady decline, both because of natural oscillations in ecosystem productivity274 and because of unsustainable overfishing of wild fish stocks.275 The looming threat of climate change may also pose problems for the future of wild fish stocks and capture fisheries.276 Climate change may cause displacement of ecosystem boundaries, alteration of species composition, ocean warming and acidification, increased eutrophication from flooding, major storm events, and introduction of new diseases, though the precise impacts are virtually impossible to calculate.277 Thus, aquaculture is expected to continue its trend of growth to satisfy consumer demand for fish products in the face of decreased productivity and abundance of wild capture fisheries

However, the otherwise bright future of aquaculture in this country may be tempered by several challenges. As noted above, the U.S. is competing with other nations to meet this demand for seafood and may struggle to reduce operating costs to compete with importers given relative land values and regulatory hurdles.278 Moreover, the industry’s technology is developing rapidly, facilitating aquaculture’s expansion into new areas that carry a lot of uncertainty. For example, the recent invention of genetically modified fish that grow faster and better resist disease may launch a robust new inland aquaculture industry and may undermine coastal operations. However, it is unclear how these new developments will ultimately affect the U.S. aquaculture sector because currently no aquaculture facilities are raising genetically modified fish for commercial sale.279

Another challenge the aquaculture industry will face is the growing incidence of spatial user conflicts. The FAO has recognized that “much of the coastline of the United States of America is well developed and competition for space in the coastal and near-shore environment creates user group conflicts.”280 Moreover, very few unallocated freshwater environments exist to support land-based operations.281 These conflicts have made moving aquaculture operations into waters farther offshore into the U.S. EEZ an attractive alternative. However, there is a paucity of reliable data on the effects of aquaculture in deep-water environments, such as the EEZ,282 making the viability of an offshore industry seem a far-off goal.283

The uncertainty faced by the industry in expanding its output is magnified by both the industry’s potential to cause environmental degradation and the lack of a clear federal regulatory structure, as the private sector is justifiably nervous to develop fully an industry when it is uncertain of the future regulatory costs and liabilities.284 The following section describes the inadequacy of the current regulatory structure for advancing a stable, sustainable aquaculture industry into the twenty first century.

B. Complexity and Inadequacy of Current Regulatory Framework

While the United States has made strides in regulating aquaculture over the last several decades,285 the current regulatory framework is too complex and, ultimately, too lenient, to realize aquaculture’s full potential and mitigate aquaculture’s environmental problems in light of the challenges the industry will face in the coming century. Without cooperation and coordination among federal agencies,286 perhaps achievable a single piece of federal legislation devoted to aquaculture development, aquaculture’s role as the creator of polluting and exploitative tragedies of the commons will continue. Many federal agencies with very different missions and jurisdictional reaches govern aquaculture in disparate, often overlapping, and often inconsistent ways, including the Environmental Protection Agency (“EPA”), the FDA, NMFS/NOAA Fisheries, the FWS, the Army Corps of Engineers (“USACE”), and the United States Coast Guard. This Section briefly discusses each agency’s role in aquaculture regulation. However, this section is not intended to provide a complete list of regulatory jurisdiction over aquaculture operations; rather, it serves to demonstrate the complexity, uncertainty, and inadequacy characterizing the regulatory field in a select few areas of aquacultural impacts. A plethora of state laws and regulations pursuant to and independent of the federal laws delineated below also complicate the sphere of aquaculture regulation,287 but are beyond the scope of this paper.288

The EPA has substantial regulatory authority over aquaculture facilities, with particular relevance to the tragedy of the commons by pollution. Discharges from many aquaculture facilities are subject to regulation under the EPA-administered federal Clean Water Act,289 the purpose of which is “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”290 The Clean Water Act provides that “[e]xcept as in compliance with this section and section[] . . . 402 of this Act, the discharge of any pollutant by any person shall be unlawful.”291 The term “discharge” means “any addition of any pollutant to navigable waters from any point source [and] any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source . . . .”292 Section 402, in turn, provides that “the Administrator may, after opportunity for public hearing, issue a permit for the discharge of any pollutant,” permits which have come to be known as National Pollutant Discharge Elimination System (“NPDES”) permits.293 EPA has by regulation interpreted the Clean Water Act to apply to discharges into a concentrated aquatic animal production facilities (“CAAPF”), a point source under the Act, meaning that the limited number of aquaculture facilities that are large enough to fall within definition of a CAAPF will require a permit in order to discharge effluent.294 However, these permits did not contain effluent limitation guidelines until 2004. 295 Since then, the largest CAAPFs, which produce more than 100,000 pounds of fish per year, have been subject to effluent limitation guidelines which contain requirements for reporting296 and for the creation of “best management plans” which must reflect efforts to minimize the discharge of solids and feed accumulation below the pens using the best practicable technology.297 However, these complex laws, many of which only apply to very large facilities and rely heavily on selfmanagement, ultimately contain little more incentive to a facility to clean up its act than the natural incentive to reduce effluent discharges that would remain stagnant beside a net pen and contaminate the stock itself. However, in quick moving waters absent good faith compliance with effluent limitation guidelines the effects of their effluent on downstream users may still be salient.298 EPA is also responsible for regulating land-based aquaculture waste disposal wells under the Safe Drinking Water Act299 and the Resource Conservation and Recovery Act, which practicably have little regulatory power over aquaculture’s impacts on aquatic or marine environments.300

The FDA’s Center for Veterinary Medicine (“CVM”) maintains regulatory authority over aquaculture operations under the Federal Food, Drug and Cosmetic Act301 in several respects. First, the FDA regulates the use of antibiotics as drugs302 through the New Animal Drug303 Application Approval Process304 approval process. The Secretary of the FDA may limit the use of animal drugs if they are found to pose a danger to public health.305 In this process, CVM must consider the effects of the use of the drug in aquaculture facilities on the environment through an Environmental Assessment, and possible Environmental Impact Statement if the approval constitutes a “major federal action significantly affecting the quality of the human environment,” under the National Environmental Policy Act (“NEPA”),306 but NEPA requires no substantive action after collection of data into these reports.307

Six drugs have been approved by the FDA for use in domestic aquaculture: Chorulon® (NADA 140-927), Finquel® (NADA 042-427), Tricaine-S (ANADA 200-226), Formalin-F® (NADA 137-687), Paracide-F® (NADA 140-831), Parasite-S® (NADA 140-989), Terramycin® (NADA 038-439), Romet-30® (NADA 125-933), and Sulfamerazine (NADA 033-950).308 Also two antibiotics have been approved for limited use for specific food fish and specific diseases. These antimicrobials are oxytetracycline (Terramycin® for Fish; oxytetracycline monoalkyl trimethyl ammonium) and a potentiated sulfonamide (Romet-30®; ormetoprim: sulfadimethoxine).309 According to the National Aquaculture Association, in aquaculture production, “[i]t is illegal to use antibiotics prophylactically to prevent aquatic animal disease or for production purposes such as to promote aquatic animal growth.”310

The FDA also has investigative authority over aquaculture. Specifically, the Food and Drug Administration Amendments Act of 2007 direct the Secretary of the Department of Health and Human Services, in which FDA is situated, to submit to Congress a report that: "(1) describes the specifics of the aquaculture and seafood inspection program; (2) describes the feasibility of developing a traceability system for all catfish and seafood products, both domestic and imported, for the purpose of identifying the processing plant of origin of such products; and (3) provides for an assessment of the risks associated with particular contaminants and banned substances."311 FDA has successfully completed this mandate, with its 2008 Enhanced Aquaculture and Seafood Inspection — Report to Congress.312 The law also authorizes the Secretary to conduct heightened inspections of aquaculture facilities.313 While these provisions have the potential to increase the transparency surrounding, and information about, aquaculture operations in U.S. waters, they are by design informational, rather than action-forcing. Aquaculture is, however, also subject to the Procedures for the Safe and Sanitary Processing and Importing of Fish and Fishery Products, also called the Seafood Hazard Analysis and Critical Control Point (“HACCP”),314 a regulatory provision passed pursuant to the Federal Food, Drug and Cosmetic Act’s definition of adulterated products.315 These regulations require aquaculturalists and other fish providers to understand and manage risks associated with aquaculture production through adoption of sanitation control procedures and sanitation monitoring plans, requirements that are aimed to make aquaculture products healthful to consumers but that are not necessarily suited to the task of protecting aquatic and marine environments surrounding aquaculture facilities.316

The FDA also regulates genetically modified fish and has been working closely with Aquabounty, the company that created the AquAdvantage® salmon, to assess possible environmental and health consequences of the production and consumption of genetically modified fish. If it approves the AquAdvantage,® FDA will regulate the biotech salmon as a “new animal drug” subject to FDA’s science-based review and approval. As explained by Lester M. Crawford, Deputy FDA Commissioner:

[T]he FDA is authorized to exercise oversight of transgenic animals under the Federal Food, Drug and Cosmetic Act, which makes our agency responsible for the safety of drugs, and defines drugs as ‘articles . . . intended to affect the structure or function of the body of man or other animals.’ Because the genetic modification affects the structure and function of the salmon, and because it may produce a protein that is not generally recognized as safe for human consumption, the biotech salmon is, in the eyes of the law, a ‘new animal drug,’ and as such is subject to the FDA’s science-based review and approval before it can be marketed. As part of this review, the FDA routinely considers evidence of a new animal drug’s effect on, among other factors, animal health; disease susceptibility; zootonic potential; animal welfare; impact on domestic and wildlife populations; and the environment.317

Thus, FDA intends to regulate genetically modified fish under the Federal Food, Drug and Cosmetic Act as a “drug,” which is defined as an “article (other than food) intended to affect the structure or any function of the body of man or other animals.”318 In sum, the FDA is deeply involved with modern aquaculture, and likely will become more intertwined with the success of the industry as aquaculture moves into the biotechnology market.

In the United States, the USDA governs freshwater aquaculture while NMFS/NOAA Fisheries, alongside the National Sea Grant Program, governs marine aquaculture.319 The USDA actively funds and subsidizes aquaculture activities in its Farm Bills, having provided nearly four million dollars in grants in 2011.320 USDA also sponsors substantial research and development efforts.321 Apart from subsidizing certain practices over others, though, the USDA does not actively manage potential environmental or public health harms. The National Sea Grant program, another agency within the Department of Commerce, also still actively funds aquaculture projects, with approximately three million dollars available to fund marine aquaculture research projects for fiscal year 2012.322 Again, though, while this funding is aimed “to support the development of environmentally and economically sustainable ocean, coastal or Great Lakes aquaculture,” it is not a regulatory mandate to aquaculture facilities, generally, to operate in a sustainable manner.

NMFS/NOAA Fisheries also regulates aquaculture activities pursuant to the Magnuson- Stevens Fishery Conservation Act (“Magnuson-Stevens”).323 Under Magnuson-Stevens, the term “fishing,” which is defined to include the “harvesting” of fish and “any other activity which can reasonably be expected to result in the . . . harvesting of fish,” has been interpreted to encompass aquaculture activities, thus giving NMFS/NOAA Fisheries jurisdiction over aquaculture activities under the Act.324 Magnuson-Stevens, as amended by the Sustainable Fisheries Act in 1996, 325 requires NMFS/NOAA Fisheries to designate essential fish habitat (“EFH”) for managed fisheries and implement conservation measures to protect those areas.326 Thus, aquaculture operations in EFH areas are subject to conservation measures, though critics point out that NOAA has been inconsistent in its application of EFH conservation measures to aquaculture facilities.327 The eight Regional Fishery Management Councils have discretion to regulate aquaculture largely as they see fit under their regional management plans.328 While some have chosen to do so, as demonstrated by the Gulf of Mexico Fishery Management Council’s Fishery Management Plan for Regulating Offshore Marine Aquaculture in the Gulf of Mexico,329 most others have abstained, and, consequently, aquaculture regulation by NMFS/NOAA Fisheries is limited on a national scale.

Moreover, NOAA recently adopted an aquaculture policy, an aspirational document that states broad policy guidelines for the agency’s involvement with aquaculture, in June 2011. The admirable objectives stated in the policy include the goals to: “encourage and foster sustainable aquaculture development that provides domestic jobs, products, and services and that is in harmony with healthy, productive, and resilient marine ecosystems [and] compatible with other uses of the marine environment,” “[e]nsure agency aquaculture decisions protect wild species and healthy, productive, and resilient coastal and ocean ecosystems, including the protecting of sensitive marine areas,” and “[w]ork internationally to learn from aquaculture best practices around the world and encourage the adoption of science-based sustainable practices and systems.”330 Ultimately, though, this policy is just that: a policy. It contains no substantive or procedural requirements for the industry or regulators going forward. Thus, while NMFS/NOAA Fisheries exerts some authority over aquaculture, its practical effect on the industry’s environmental record is likely limited.

NMFS/NOAA Fisheries may also regulate aquaculture, in concert with its inland counterpart FWS, when aquaculture impacts endangered or threatened species under the federal Endangered Species Act (“ESA”), 331 commonly thought of as the “pit bull”332 of environmental law. Section 7 of the ESA directs that “[e]ach Federal agency shall, in consultation with and with the assistance of the Secretary [of Commerce or of Interior], insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of [critical] habitat of such species . . . .”333 An agency can only avoid satisfaction of this duty under an Incidental Take Statement by complying with detailed procedural and substantive requirements, including completion of a Biological Opinion in consultation with NMFS/NOAA Fisheries or FWS, depending on where the species is found.334

Moreover, any aquaculture project, whether funded by a federal agency or not, is subject to the section 9 take prohibition, which provides that “it is unlawful for any person subject to the jurisdiction of the United States to . . . take any [endangered] species within the United States or the territorial sea of the United States [or] . . . take any such species upon the high seas . . . .”335 This means that if an aquaculture operator actually “take[s]”336 an inland aquatic or coastal marine endangered or threatened species, which can include habitat modification that actually injures a listed species, it will be subject to severe civil penalties under the ESA unless it completes the Incidental Take Permit and Habitat Conservation Plan processes to the satisfaction of NMFS/NOAA Fisheries or FWS.337 The ESA has potential to have a large impact on the sustainability of aquaculture operations if facilities attempt to clean up their operations to avoid harming listed species. However, given that listed species are by definition hard to find, thus endangered or threatened, and that FWS and NMFS/NOAA Fisheries face substantial difficulties and costs in monitoring aquatic and marine environments to discover actual take of listed species, the deterrent effect of the ESA is likely limited.

Finally, the USACE and U.S. Coast Guard can exercise authority over aquaculture facilities in navigable waters. The Rivers and Harbors Act of 1899338 provides that “it shall not be lawful to build or commence the building of any wharf, pier, dolphin, boom, weir, breakwater, bulkhead, jetty, or other structures in any port, roadstead, haven, harbor, canal, navigable river, or other water of the United States . . . except on plans recommended by the Chief of Engineers and authorized by the Secretary of the Army . . . .”339 Moreover, the Act makes it unlawful “in any manner to alter or modify the course, location, condition, or capacity of, any . . . channel of any navigable water of the United States” without USACE authorization in a section 10 permit.340 Similarly, the Coast Guard governs structure markings like lighting and signals to ensure safe passage of vessels past structures in waters of the United States.341 These requirements are usually incorporated into USACE permits under section 10 of the Rivers and Harbors Act.342 However, while these authorities may impact the siting of and markings on facilities and the agencies must still consider environmental impacts of permitting aquaculture operations under NEPA,343 practically speaking they are unlikely to impact the sustainability of facilities’ operation as the applicable laws contain no substantive environmental requirements.

Thus, despite the salient negative environmental effects the modern aquaculture industry has had, the United States lacks a strong national aquaculture policy and supporting federal presence.344 The current patchwork regulatory structure is ineffectual at preventing the tragedies of the commons that have arisen by aquaculture’s pollution and exploitation of inland aquatic and coastal marine environments. While attempts have been made to address the problems aquaculture has begun to cause, to aid the industry in realizing its full potential as a solution to a tragedy of the commons, these attempts have not been strong enough to guide the industry onto a sustainable path.

Industry is not the only group with a responsibility here, as indicated in the National Aquaculture Act of 1980.345 Rather, the United States, which has played a large role in subsidizing and encouraging development of aquaculture throughout the industry’s history, has a duty to ensure that the industry does not come to be characterized by tragedies of pollution and exploitation like the tragedy well underway in the context of wild capture fisheries. The U.S. government must instead condition its support on, or plainly mandate, environmentally and socially responsible industry behavior. The World Bank explained the dilemma well: “[t]he vision of sustainable aquaculture demands not only a favorable business climate, but also a governance framework that embraces social objectives and enforces environmental standards.”346 Furthermore, it has become clear that the success of aquaculture in the coming years will also depend on the extent to which coastal areas are polluted by other causes, like inland nonpoint source pollution. 347 Thus, state and federal regulators must also regulate sources of coastal pollution to give adequate support to a sustainable aquaculture industry.

Luckily, the rapid development of technology accompanying the “blue revolution” 348 has ensured that sustainable aquaculture production is available and feasible. For example, in addition to the possibility of moving offshore to dilute coastal pollution, researchers have developed closed systems that require minimal disease and pest control and produce virtually no pollution.349 Aquaculturalists are also perfecting integrated systems, also called polyculture systems that combine culture of fish aquaculture with culture of mollusks or seaweed so “the wastes from one organism are used as inputs to another, resulting in the optimal use of resources and less pollution overall.”350 These systems have the potential to be both more environmentally sound operations and more economically efficient.351 Moreover, the use of fishmeal in aquaculture feed can be reduced and researchers are using developing more sustainable plant-based feeds for use on fish farms.352 Thus, the technology exists to guide aquaculture onto a sustainable path.

Aquaculture’s recent boom and the rapid technological development have made it the obvious choice going forward for satisfying the world’s growing appetite for protein.353 It is a choice that has potential to be more sustainable, as an alternative to exploitative overfishing and as a lower-impact source of protein than many industrially raised terrestrial livestock, if done correctly. 354 But we have a long way to go. As stated by James Connaughton, former Chairman of the White House Council on Environmental Quality,

Now is the time, not to have a national conversation about aquaculture, now is the time to have a national system of sound management of aquaculture to provide the certainty that’s necessary to do it right, to assure that we have the ecological integrity to the process [sic], and, again, to set a beacon for the world.355

Without institution of “[m]utual coercion mutually agreed upon,” the United States aquaculture industry is causing, rather than solving, tragedies of the commons. 356

VI. Conclusion

While this Paper recognizes that it would be unreasonable to envision sustainable aquaculture as a no-impact alternative to other aquatic and terrestrial food sources,357 it is certainly reasonable to hold aquaculture to its potential to be minimally impactful relative to other protein sources. While historically the United States envisioned aquaculture as a solution to the exploitation tragedy of the commons, and not as a contributor to the pollution tragedy, the United States still has the potential to farm fish in a manner that maintains its status as a net solution to the problems of our global commons. However, the United States can ensure that the aquaculture industry is not “destined to repeat the problems associated with industrial agriculture [or industrial fishing] and cause environmental disaster . . . .”358 The first step is acknowledging the problem, grounding aquaculture’s mistakes in history, and learning from history to craft a solution that solves the current problem without creating additional strains on the local, national, or global commons. With carefully crafted, clear, and streamlined regulatory requirements, the U.S. aquaculture industry can become a “green” blue revolution and realize its full, impressive potential.

#### Best evidence proves a majority of fisheries are still in decline

Plumer, 13 (10/29/2013, Brad, “Just how badly are we overfishing the oceans?” <http://www.washingtonpost.com/blogs/wonkblog/wp/2013/10/29/just-how-badly-are-we-overfishing-the-ocean/0/>, JMP)

Humans now have the technology to find and catch every last fish on the planet. Trawl nets, drift nets, longlines, GPS, sonar... As a result, fishing operations have expanded to virtually all corners of the ocean over the past century.

That, in turn, has put a strain on fish populations. The world's marine fisheries peaked in the 1990s, when the global catch was higher than it is today.\* And the populations of key commercial species like bluefin tuna and cod have dwindled, in some cases falling more than 90 percent.

So just how badly are we overfishing the oceans? Are fish populations going to keep shrinking each year — or could they recover? Those are surprisingly contentious questions, and there seem to be a couple of schools of thought here.

The pessimistic view, famously expressed by fisheries expert Daniel Pauly, is that we may be facing "The End of Fish." One especially dire 2006 study in Science warned that many commercial ocean fish stocks were on pace to “collapse” by mid-century — at which point they would produce less than 10 percent of their peak catch. Then it's time to eat jellyfish.

Other experts have countered that this view is far too alarmist.\*\* A number of countries have worked hard to improve their fisheries management over the years, including Iceland, Australia, New Zealand, and the United States. "The U.S. is actually a big success story in rebuilding fish stocks," Ray Hilborn, a marine biologist at the University of Washington, told me last year. Overfishing isn't inevitable. We can fix it.

Both sides make valid points — but the gloomy view is hard to dismiss. That's the argument of a new paper in Marine Pollution Bulletin by Tony Pitcher and William Cheung of the University of British Columbia that weighs in on this broader debate. They conclude that some fisheries around the world are indeed improving, though these appear to be a minority for now.

"Several deeper analyses of the status of the majority of world fisheries confirm the previous dismal picture," they conclude. "Serious depletions are the norm world-wide, management quality is poor, catch per effort is still declining."

The decline of fisheries

One reason the debate about overfishing is so contentious is that it's hard to get a precise read on the state of the world's marine fisheries. (The U.N. Food and Agriculture Organization tries its best in this annual report.) Ideally, we'd have in-depth stock assessments for the entire world, but those are difficult, expensive, and fairly rare.

So, in their paper, Pitcher and Cheung review a number of recent studies that use indirect measurements instead. For example, they note that recent analyses of fish catches suggest that about 58 percent of the world's fish stocks have now collapsed or are overexploited:

It's important to note that this is only one estimate — and a disputed one at that. A 2011 study in Conservation Biology by Trevor Branch et. al., by contrast, estimated that only 7 to 13 percent of stocks were collapsed and 28 to 33 percent "overexploited."\*\*\* Focusing on catches can be a tricky metric for judging the state of fisheries (it can be hard, for instance, to track changes in fishing practices over time that might bias the results).

So the authors consider a variety of other metrics, too. One example: The amount of effort that fishermen have put into catching fish has increased significantly in the past three decades, as measured by engine power and days that fishermen spend at sea. But the amount of fish actually caught has nevertheless stagnated since the 1990s:

"Given the increase in global fishing effort, the lack of increase in global fisheries catch in the last decade and the fact that most productive areas have now been exploited by fisheries," Pitcher and Cheung note, it's quite possible that "global exploited fish stocks are likely to be in a decreasing trend."

Could fisheries recover?

That all said, there are also some reasons for optimism. In 2009, ecologist Boris Worm and his colleagues took a look at more than 350 detailed fish stock assessments and found that many fisheries in North America and Europe were actually recovering. In the United States, annual catch limits and market-based permit programs have helped some fish populations rebound.

The real question is whether these success stories are the exception rather than the rule. Pitcher and Cheung argue that the fish stocks analyzed in that 2009 paper make up just 16 percent of the global catch — and are mostly confined to well-managed fisheries in richer countries.

By contrast, more than 80 percent of the world's fish are caught in the rest of the world, in places like Asia and Africa. While data here is patchier, many of the nations in these regions are far less likely to follow the U.N.'s Code of Conduct for Responsible Fisheries, and evidence suggests that "serious depletions are the norm" here:

"It all depends where you look," Pitcher said in an interview. "There are a few places where fisheries are doing better: The U.S., Australia, Canada, Norway. But those are relatively rare. In most places, the evidence suggests that things are getting worse." Given that the United States imports 91 percent of its seafood, that's an important caveat.

#### The decline of fisheries destroys marine ecosystems and risks starvation of hundreds of millions

Pauly, 9 --- professor at the Fisheries Centre of the University of British Columbia (9/28/2009, Daniel, “Aquacalypse Now,” <http://www.newrepublic.com/article/environment-energy/aquacalypse-now>, JMP)

The jig, however, is nearly up. In 1950, the newly constituted Food and Agriculture Organization (FAO) of the United Nations estimated that, globally, we were catching about 20 million metric tons of fish (cod, mackerel, tuna, etc.) and invertebrates (lobster, squid, clams, etc.). That catch peaked at 90 million tons per year in the late 1980s, and it has been declining ever since. Much like Madoff’s infamous operation, which required a constant influx of new investments to generate “revenue” for past investors, the global fishing-industrial complex has required a constant influx of new stocks to continue operation. Instead of restricting its catches so that fish can reproduce and maintain their populations, the industry has simply fished until a stock is depleted and then moved on to new or deeper waters, and to smaller and stranger fish. And, just as a Ponzi scheme will collapse once the pool of potential investors has been drained, so too will the fishing industry collapse as the oceans are drained of life.

Unfortunately, it is not just the future of the fishing industry that is at stake, but also the continued health of the world’s largest ecosystem. While the climate crisis gathers front-page attention on a regular basis, people--even those who profess great environmental consciousness--continue to eat fish as if it were a sustainable practice. But eating a tuna roll at a sushi restaurant should be considered no more environmentally benign than driving a Hummer or harpooning a manatee. In the past 50 years, we have reduced the populations of large commercial fish, such as bluefin tuna, cod, and other favorites, by a staggering 90 percent. One study, published in the prestigious journal Science, forecast that, by 2048, all commercial fish stocks will have “collapsed,” meaning that they will be generating 10 percent or less of their peak catches. Whether or not that particular year, or even decade, is correct, one thing is clear: Fish are in dire peril, and, if they are, then so are we.

The extent of the fisheries’ Ponzi scheme eluded government scientists for many years. They had long studied the health of fish populations, of course, but typically, laboratories would focus only on the species in their nation’s waters. And those studying a particular species in one country would communicate only with those studying that same species in another. Thus, they failed to notice an important pattern: Popular species were sequentially replacing each other in the catches that fisheries were reporting, and, when a species faded, scientific attention shifted to the replacement species. At any given moment, scientists might acknowledge that one-half or two-thirds of fisheries were being overfished, but, when the stock of a particular fish was used up, it was simply removed from the denominator of the fraction. For example, the Hudson River sturgeon wasn’t counted as an overfished stock once it disappeared from New York waters; it simply became an anecdote in the historical record. The baselines just kept shifting, allowing us to continue blithely damaging marine ecosystems.

It was not until the 1990s that a series of high-profile scientific papers demonstrated that we needed to study, and mitigate, fish depletions at the global level. They showed that phenomena previously observed at local levels--for example, the disappearance of large species from fisheries’ catches and their replacement by smaller species--were also occurring globally. It was a realization akin to understanding that the financial meltdown was due not to the failure of a single bank, but, rather, to the failure of the entire banking system--and it drew a lot of controversy.

The notion that fish are globally imperiled has been challenged in many ways--perhaps most notably by fisheries biologists, who have questioned the facts, the tone, and even the integrity of those making such allegations. Fisheries biologists are different than marine ecologists like myself. Marine ecologists are concerned mainly with threats to the diversity of the ecosystems that they study, and so, they frequently work in concert with environmental NGOs and are often funded by philanthropic foundations. By contrast, fisheries biologists traditionally work for government agencies, like the National Marine Fisheries Service at the Commerce Department, or as consultants to the fishing industry, and their chief goal is to protect fisheries and the fishermen they employ. I myself was trained as a fisheries biologist in Germany, and, while they would dispute this, the agencies for which many of my former classmates work clearly have been captured by the industry they are supposed to regulate. Thus, there are fisheries scientists who, for example, write that cod have “recovered” or even “doubled” their numbers when, in fact, they have increased merely from 1 percent to 2 percent of their original abundance in the 1950s.

Yet, despite their different interests and priorities--and despite their disagreements on the “end of fish”--marine ecologists and fisheries scientists both want there to be more fish in the oceans. Partly, this is because both are scientists, who are expected to concede when confronted with strong evidence. And, in the case of fisheries, as with global warming, the evidence is overwhelming: Stocks are declining in most parts of the world. And, ultimately, the important rift is not between these two groups of scientists, but between the public, which owns the sea’s resources, and the fishing-industrial complex, which needs fresh capital for its Ponzi scheme. The difficulty lies in forcing the fishing-industrial complex to catch fewer fish so that populations can rebuild.

It is essential that we do so as quickly as possible because the consequences of an end to fish are frightful. To some Western nations, an end to fish might simply seem like a culinary catastrophe, but for 400 million people in developing nations, particularly in poor African and South Asian countries, fish are the main source of animal protein. What’s more, fisheries are a major source of livelihood for hundreds of million of people. A recent World Bank report found that the income of the world’s 30 million small-scale fisheries is shrinking. The decrease in catch has also dealt a blow to a prime source of foreign-exchange earnings, on which impoverished countries, ranging from Senegal in West Africa to the Solomon Islands in the South Pacific, rely to support their imports of staples such as rice.

And, of course, the end of fish would disrupt marine ecosystems to an extent that we are only now beginning to appreciate. Thus, the removal of small fish in the Mediterranean to fatten bluefin tuna in pens is causing the “common” dolphin to become exceedingly rare in some areas, with local extinction probable. Other marine mammals and seabirds are similarly affected in various parts of the world. Moreover, the removal of top predators from marine ecosystems has effects that cascade down, leading to the increase of jellyfish and other gelatinous zooplankton and to the gradual erosion of the food web within which fish populations are embedded. This is what happened off the coast of southwestern Africa, where an upwelling ecosystem similar to that off California, previously dominated by fish such as hake and sardines, has become overrun by millions of tons of jellyfish.

Jellyfish population outbursts are also becoming more frequent in the northern Gulf of Mexico, where the fertilizer-laden runoff from the Mississippi River fuels uncontrolled algae blooms. The dead algae then fall to a sea bottom from which shrimp trawling has raked all animals capable of feeding on them, and so they rot, causing Massachusetts-sized “dead zones.” Similar phenomena--which only jellyfish seem to enjoy--are occurring throughout the world, from the Baltic Sea to the Chesapeake Bay, and from the Black Sea in southeastern Europe to the Bohai Sea in northeastern China. Our oceans, having nourished us since the beginning of the human species some 150,000 years ago, are now turning against us, becoming angry opponents.

That dynamic will only grow more antagonistic as the oceans become warmer and more acidic because of climate change. Fish are expected to suffer mightily from global warming, making it essential that we preserve as great a number of fish and of fish species as possible, so that those which are able to adapt are around to evolve and propagate the next incarnations of marine life. In fact, new evidence tentatively suggests that large quantities of fish biomass could actually help attenuate ocean acidification. In other words, fish could help save us from the worst consequences of our own folly--yet we are killing them off. The jellyfish-ridden waters we’re seeing now may be only the first scene in a watery horror show.

#### Undermines the overall ocean environment

Denoon, 6 (11/2/2006, Daniel, “Salt-Water Fish Extinction Seen By 2048,” <http://www.cbsnews.com/news/salt-water-fish-extinction-seen-by-2048/>)

The apocalypse has a new date: 2048.

That's when the world's oceans will be empty of fish, predicts an international team of ecologists and economists. The cause: the disappearance of species due to overfishing, pollution, habitat loss, and climate change.

The study by Boris Worm, PhD, of Dalhousie University in Halifax, Nova Scotia, -- with colleagues in the U.K., U.S., Sweden, and Panama -- was an effort to understand what this loss of ocean species might mean to the world.

The researchers analyzed several different kinds of data. Even to these ecology-minded scientists, the results were an unpleasant surprise.

"I was shocked and disturbed by how consistent these trends are -- beyond anything we suspected," Worm says in a news release.

"This isn't predicted to happen. This is happening now," study researcher Nicola Beaumont, PhD, of the Plymouth Marine Laboratory, U.K., says in a news release.

"If biodiversity continues to decline, the marine environment will not be able to sustain our way of life. Indeed, it may not be able to sustain our lives at all," Beaumont adds.

Already, 29% of edible fish and seafood species have declined by 90% -- a drop that means the collapse of these fisheries.

But the issue isn't just having seafood on our plates. Ocean species filter toxins from the water. They protect shorelines. And they reduce the risks of algae blooms such as the red tide.

"A large and increasing proportion of our population lives close to the coast; thus the loss of services such as flood control and waste detoxification can have disastrous consequences," Worm and colleagues say.

The researchers analyzed data from 32 experiments on different marine environments.

They then analyzed the 1,000-year history of 12 coastal regions around the world, including San Francisco and Chesapeake bays in the U.S., and the Adriatic, Baltic, and North seas in Europe.

Next, they analyzed fishery data from 64 large marine ecosystems.

And finally, they looked at the recovery of 48 protected ocean areas.

Their bottom line: Everything that lives in the ocean is important. The diversity of ocean life is the key to its survival. The areas of the ocean with the most different kinds of life are the healthiest.

But the loss of species isn't gradual. It's happening fast -- and getting faster, the researchers say.

Worm and colleagues call for sustainable fisheries management, pollution control, habitat maintenance, and the creation of more ocean reserves.

This, they say, isn't a cost; it's an investment that will pay off in lower insurance costs, a sustainable fish industry, fewer natural disasters, human health, and more.

"It's not too late. We can turn this around," Worm says. "But less than 1% of the global ocean is effectively protected right now."

Worm and colleagues report their findings in the Nov. 3 issue of Science.

#### The impact is extinction

Schofield, 14 --- Director of Research at the Australian Centre for Ocean Resource and Security University of Wollongong (3/10/2014, Clive, “Why our precious oceans are under threat,” <http://uowblogs.com/globalchallenges/2014/03/10/the-threats-facing-our-precious-oceans/>, JMP)

Science fiction author Arthur C Clarke once observed, “How inappropriate to call this planet Earth when it is quite clearly Ocean.” Good point, well made.

The oceans clearly dominate the world spatially, encompassing around 72 per cent of the surface of the planet.

The vast extent of the oceans only tells part of the story, however.

The oceans are critical to the global environment and human survival in numerous ways – they are vital to the global nutrient cycling, represent a key repository and supporter of biological diversity on a world scale and play a fundamental role in driving the global atmospheric system.

Coastal and marine environments support and sustain key habitats and living resources, notably fisheries and aquaculture. These resources continue to provide a critical source of food for hundreds of millions of people.

The fishing industry supports the livelihoods of an estimated 540 million people worldwide and fisheries supply more than 15 per cent of the animal protein consumed by 4.2 billion people globally.

Moreover, the oceans are an increasing source of energy resources and underpin the global economy through sea borne trade.

Overall, it has been estimated that 61 per cent of global GNP is sourced from the oceans and coastal areas within 100km of the sea.

Coasts and marine zones also provide essential, but often not fully acknowledged, ecosystem services.

Coasts and marine zones are therefore of critical importance across scales, from the global to the regional, national and sub-national coastal community levels. At the same time the oceans also remain largely (95 per cent) unexplored.

#### \*\*\*Independently, global food production will inevitably breakdown --- a shift to ocean aquaculture key to sustainably feed the growing population and prevent massive deforestation

Strasser, 14 --- Senior Editor of ThinkProgress (4/21/2014, Annie-Rose, “The New, Innovative And More Efficient Way Of Feeding People,” <http://thinkprogress.org/climate/2014/04/21/3422486/big-ag-takes-to-the-ocean/>, JMP)

Don Kent, President of the Hubbs-Sea World Research Institute, was standing in the seafood aisle of a Whole Foods in the affluent San Diego neighborhood of La Jolla recently when he took out his phone and snapped a photo of a fresh-looking branzino.

“Branzino is European sea bass,” Kent explained. “It’s grown in the Mediterranean. And it’s flown 6,900 miles from Greece to here and then it’s put on ice in La Jolla.”

Kent, whose organization studies the intersection of nature and human activity and offers solutions on how the two can co-exist, is one of the people who believes there’s a different way to approach how we get our protein here in the United States. He insists that there’s a new, innovative, and more efficient method of feeding people — not just in La Jolla, but all over the world. Aquaculture. Or, as it’s known to most people, fish farming.

“We spend 130 million dollars a year on air freight for the 300,000 metric tons of salmon that get flown into the U.S. from Chile. Think of the carbon footprint associated with that,” he says. “There’s absolutely no reason why that brazino shouldn’t be a white sea bass grown three miles off the coast. And then imagine the carbon footprint that’s saved in doing that.”

What, exactly, is aquaculture? The basic idea is that you’re farming aquatic life. The specifics, however, vary quite a bit. In the case of fish, eggs are fostered into small fish at a hatchery, raised for food, and farmed whenever they’re needed. The fish can be raised in tanks or in net pens, in fresh water, off the coast, or out in the open ocean. And fish are just one kind of aquaculture; a similar process is utilized to farm shellfish — like mussels or oysters — and for seaweeds.

Aquaculture right now is in an age of innovation. The advent of indoor tank farming is one promising way fish farming could grow. Another would be going out into the open ocean and dropping fish in large, globe-shaped aquapods down below the surface.

“Open-ocean aquaculture is one of the emerging frontiers,” says Michael Rubino, Director of the Aquaculture Office at the National Oceanic and Atmospheric Administration. “There’s not much of it yet but we have crowded coastlines, we have coastlines that have a lot of new trees and they’re shallow, or they’re multiple uses, so some people think that going further offshore, you avoid those multiple use conflicts and get a more stable environment.”

Attempts to take aquaculture offshore include building farms off of decommissioned oil rigs. Farmers also hope it can help them to farm in rougher waters where weather events like hurricanes might get in the way. Some aquaculture groups even hope that there is a way to fuse offshore farms with renewable energy projects.

Spend just a few minutes reading news about agriculture and climate change these days, and you’ll understand what’s driving people to consider scaling up aquaculture: The latest report from the United Nations’ Intergovernmental Panel on Climate Change tells us we’re headed toward a “breakdown of food systems linked to warming, drought, flooding, and precipitation variability and extremes.” Studies come out every week, practically, that say drought threatens our supply of key grains like wheat, corn, and rice. The warming globe is even slowing down cows’ production of milk.

And not only is our food on the fritz, but it’s causing a lot of the problems that seem to be leading to its own demise. Cows, a growing source of protein here in the United States, are major emitters of methane, a potent greenhouse gas. Meat production is also a serious drain on other resources: A quarter pound of hamburger meat uses up 6.7 pounds of grains and 52.8 gallons of water. We’re paying a high price to get our protein, and all the while our population is growing at a breakneck speed. There are a lot of hungry mouths to feed. The United Nations has urged “a substantial worldwide diet change, away from animal products” altogether. But aquaculture might be a good stepping stone.

“Overall, if we’re going to if we’re going to adequately nourish the increasing number of billions of people on this planet continue to consume the amount of seafood we consume — or put more apocalyptically, if we’re going to adequately nourish the increasing number of billions of people on this planet,” Michael Conathan, Director of Ocean Policy at the Center for American Progress, told ThinkProgress, “more and more protein is going to have to come from aquaculture.”

Experts say there are myriad reasons why the world can and should shift toward getting more of its sustenance from aquaculture. For one thing, it can be much more efficient than the status quo.

“The thing about aquaculture is that from a resource efficiency perspective it’s one of the most resource-efficient ways to produce protein in terms of the amount of food and the amount of space it takes,” says NOAA’s Rubino. “Far more than land animals. You’re not using fresh water [to grow crops to feed land animals], and the feed conversion of fish is roughly one to one — one pound of food for one pound of flesh — as opposed to pork or beef where it’s seven or ten to one … So from an environmental footprint perspective, it’s very efficient. You can also grow a lot of fish in a very small space. They don’t need a lot of space whether it’s a pond or a tank, as opposed to grazing land or all the corn or soybeans that it takes to feed animals.”

As it stands now, 40 percent of the non-water surface of earth is used for agriculture. A whopping 30 percent of land that’s not covered in ice is being used not to feed us directly, but to feed the things that feed us, namely chickens, cows, and pigs. One of the effects of this is that agriculture is driving massive deforestation.

#### \*\*\*Deforestation will cause extinction

Chivian 11, Dr. Eric S. Chivian is the founder and Director of the Center for Health and the Global Environment (CHGE) at Harvard Medical School and directs the Biodiversity and Human Health Progam. He is also an Assistant Clinical Professor of Psychiatry at Harvard Medical School. Chivian works with the United Nations on how to address the pressing environmental problems the world is facing. (“Species Extinction, Biodiversity Loss and Human Health”, http://www.ilo.org/oshenc/part-vii/environmental-health-hazards/item/505-species-extinction-biodiversity-loss-and-human-health, 2011) Kerwin

Human activity is causing the extinction of animal, plant and microbial species at rates that are a thousand times greater than those which would have occurred naturally (Wilson l992), approximating the largest extinctions in geological history. When homo sapiens evolved, some l00 thousand years ago, the number of species that existed was the largest ever to inhabit the Earth (Wilson l989). Current rates of species loss are reducing these levels to the lowest since the end of the Age of Dinosaurs, 65 million years ago, with estimates that one-fourth of all species will become extinct in the next 50 years (Ehrlich and Wilson l99l).

In addition to the ethical issues involved - that we have no right to kill off countless other organisms, many of which came into being tens of millions of years prior to our arrival - this behaviour is ultimately self-destructive, upsetting the delicate ecological balance on which all life depends, including our own, and destroying the biological diversity that makes soils fertile, creates the air we breathe and provides food and other life-sustaining natural products, most of which remain to be discovered.

The exponential growth in human population coupled with an even greater rise in the consumption of resources and in the production of wastes, are the main factors endangering the survival of other species. Global warming, acid rain, the depletion of stratospheric ozone and the discharge of toxic chemicals into the air, soil and fresh- and salt-water ecosystems - all these ultimately lead to a loss of biodiversity. But it is habitat destruction by human activities, particularly deforestation, that is the greatest destroyer.

This is especially the case for tropical rainforests. Less than 50% of the area originally covered by prehistoric tropical rainforests remains, but they are still being cut and burned at a rate of approximately l42,000 square kilometres each year, equal in area to the countries of Switzerland and the Netherlands combined; this is a loss of forest cover each second the size of a football field (Wilson l992). It is this destruction which is primarily responsible for the mass extinction of the world’s species.

It has been estimated that there are somewhere between l0 million and l00 million different species on Earth. Even if a conservative estimate of 20 million total world species is used, then l0 million species would be found in tropical rainforests, and at current rates of tropical deforestation, this would mean 27,000 species would be lost in tropical rainforests alone each year, or more than seventy-four per day, three each hour (Wilson l992).

This article examines the human health implications resulting from this widespread loss of biological diversity. It is the author’s belief that if people fully comprehended the effect these massive species extinctions will have - in foreclosing the possibility of understanding and treating many incurable diseases, and ultimately, perhaps, in threatening human survival - then they would recognize that the current rates of biodiversity loss represent nothing less than a slowly evolving medical emergency and would demand that efforts to preserve species and ecosystems be given the highest priority.

#### \*\*\*Also, ensuring supply of fish is critical to prevent a Malthusian collapse

Frezza, 12 --- fellow at the Competitive Enterprise Institute and a Boston-based venture capitalist (11/26/2012, Bill, “Regulatory Uncertainty Drives Fish Farmer to Foreign Waters,” <http://www.realclearmarkets.com/articles/2012/11/26/regulatory_uncertainty_drives_fish_farmer_to_foreign_waters_100008.html>, JMP)

Feeding 7 billion people is no small challenge. As it has from time immemorial, high quality protein harvested from the sea plays a major role in avoiding Malthusian collapse. Commercial fishermen bring in a wild catch of roughly 90 million tons of fish each year, with another 70 million tons coming from aquaculture.

The latter number is the one to watch. While the world's wild fish catch has flattened over the past two decades, with many fishing grounds facing depletion and certain species being threatened with extinction, fish farming continues to grow at a sharp clip, doubling over the last decade. This should come as no surprise to anyone who understands the very different economic incentives that prevail under the tragedy of the commons versus those that yield the bounty produced under private property regimes.

Yet farmed fish still carries a bad rap, both from environmentalists concerned about the pollution caused by on-shore and near-shore farms, and from food snobs who favor the more robust taste of wild caught fish.

#### \*\*\*This will collapse civilization --- causes disease spread, terrorism, and economic collapse

Brown, 9 --- founder of both the WorldWatch Institute and the Earth Policy Institute (May 2009, Lester R., Scientific American, “Could Food Shortages Bring Down Civilization?” Ebsco)

The biggest threat to global stability is the potential for food crises in poor countries to cause government collapse. Those crises are brought on by ever worsening environmental degradation

One of the toughest things for people to do is to anticipate sudden change. Typically we project the future by extrapolating from trends in the past. Much of the time this approach works well. But sometimes it fails spectacularly, and people are simply blindsided by events such as today's economic crisis.

For most of us, the idea that civilization itself could disintegrate probably seems preposterous. Who would not find it hard to think seriously about such a complete departure from what we expect of ordinary life? What evidence could make us heed a warning so dire--and how would we go about responding to it? We are so inured to a long list of highly unlikely catastrophes that we are virtually programmed to dismiss them all with a wave of the hand: Sure, our civilization might devolve into chaos--and Earth might collide with an asteroid, too!

For many years I have studied global agricultural, population, environmental and economic trends and their interactions. The combined effects of those trends and the political tensions they generate point to the breakdown of governments and societies. Yet I, too, have resisted the idea that food shortages could bring down not only individual governments but also our global civilization.

I can no longer ignore that risk. Our continuing failure to deal with the environmental declines that are undermining the world food economy--most important, falling water tables, eroding soils and rising temperatures--forces me to conclude that such a collapse is possible.

The Problem of Failed States

Even a cursory look at the vital signs of our current world order lends unwelcome support to my conclusion. And those of us in the environmental field are well into our third decade of charting trends of environmental decline without seeing any significant effort to reverse a single one.

In six of the past nine years world grain production has fallen short of consumption, forcing a steady drawdown in stocks. When the 2008 harvest began, world carryover stocks of grain (the amount in the bin when the new harvest begins) were at 62 days of consumption, a near record low. In response, world grain prices in the spring and summer of last year climbed to the highest level ever.

As demand for food rises faster than supplies are growing, the resulting food-price inflation puts severe stress on the governments of countries already teetering on the edge of chaos. Unable to buy grain or grow their own, hungry people take to the streets. Indeed, even before the steep climb in grain prices in 2008, the number of failing states was expanding [see sidebar at left]. Many of their problem's stem from a failure to slow the growth of their populations. But if the food situation continues to deteriorate, entire nations will break down at an ever increasing rate. We have entered a new era in geopolitics. In the 20th century the main threat to international security was superpower conflict; today it is failing states. It is not the concentration of power but its absence that puts us at risk.

States fail when national governments can no longer provide personal security, food security and basic social services such as education and health care. They often lose control of part or all of their territory. When governments lose their monopoly on power, law and order begin to disintegrate. After a point, countries can become so dangerous that food relief workers are no longer safe and their programs are halted; in Somalia and Afghanistan, deteriorating conditions have already put such programs in jeopardy.

Failing states are of international concern because they are a source of terrorists, drugs, weapons and refugees, threatening political stability everywhere. Somalia, number one on the 2008 list of failing states, has become a base for piracy. Iraq, number five, is a hotbed for terrorist training. Afghanistan, number seven, is the world's leading supplier of heroin. Following the massive genocide of 1994 in Rwanda, refugees from that troubled state, thousands of armed soldiers among them, helped to destabilize neighboring Democratic Republic of the Congo (number six).

Our global civilization depends on a functioning network of politically healthy nation-states to control the spread of infectious disease, to manage the international monetary system, to control international terrorism and to reach scores of other common goals. If the system for controlling infectious diseases--such as polio, SARS or avian flu--breaks down, humanity will be in trouble. Once states fail, no one assumes responsibility for their debt to outside lenders. If enough states disintegrate, their fall will threaten the stability of global civilization itself.

#### The plan sets a global model that saves marine ecosystems

Naylor, 6 --- Fellow at the Center for Environmental Science and Policy, Stanford University (Spring 2006, Rosamond L., “Environmental Safeguards for Open-Ocean Aquaculture,” <http://issues.org/22-3/naylor/>, JMP)

The need for national environmental standards

Whether environmentalists like it or not, marine aquaculture is here to stay and will inevitably expand into new environments as global population and incomes grow. Although the United States is in a position to make itself a global model for sustainable fish production in the open ocean, the proposed bill unfortunately falls far short of this vision. Pursuant to the recommendations of the Pew Commission, an aggressive marine aquaculture policy is needed at the national level to protect ocean resources and ecosystems. Within this policy framework, several specific features are needed:

The establishment of national environmental standards for siting and operation that minimize adverse effects on marine resources and ecosystems and that set clear limits on allowable ecological damage.

The establishment of national effluent guidelines through the EPA for biological, nutrient, and chemical pollution from coastal and offshore fish farms, using NPDES permits to minimize cumulative effluent impacts.

The establishment of substantive liability criteria for firms violating environmental standards, including liability for escaped fish and poorly controlled pathogen outbreaks.

The establishment of rules for identifying escaped farm fish by their source and prohibiting the use of genetically modified fish in ocean cages.

The establishment of a transparent process that provides meaningful public participation in decisions on leasing and permitting of offshore aquaculture facilities and by which marine aquaculture operations can be monitored and potentially closed if violations occur.

The establishment of royalty payments process for offshore aquaculture leases that would compensate society for the use of public federal waters.

At the same time, firms exceeding the minimum standards should be rewarded, for example, through tax breaks or reductions in royalty fees, in order to encourage environmental entrepreneurship and international leadership. By articulating a comprehensive set of environmental standards and incentives within the draft of the law, the bill would gain acceptance by a broad constituency interested in the sustainable use of ocean resources.

Proponents of offshore aquaculture might argue that these recommendations hold the industry to exceedingly high standards. Yes, the standards are high, but also essential. There is now a widespread realization that the ability of the oceans to supply fish, assimilate pollution, and maintain ecosystem integrity is constrained by the proliferation of human activities on land and at sea. Offshore aquaculture could help to alleviate these constraints, but only if it develops under clear and enforceable environmental mandates.

#### U.S. standards will encourage better practices in other countries

PHYSORG.com, 7 (7/2/2007, “US in support of more ocean based aquaculture,” <http://www.thefishsite.com/fishnews/4630/us-in-support-of-more-ocean-based-aquaculture>, JMP)

US - Government and industry leaders are urging a headlong plunge into ocean fish farming to meet surging global demand, even though environmental activists are calling for a 'go-slow' approach.

A two-day aquaculture summit hosted by the US Commerce Department in Washington last month, brought together advocates of a broader push into fish farming as lawmakers push to facilitate ocean farms similar to those used in Asia, Norway and Chile.

Backers of aquaculture point out that with wild fish stocks declining around the world, nearly half the seafood on people's tables comes from farms.

About 90 per cent of farmed seafood comes from Asia.

The United States accounts for less that two percent of the 70 billion-dollar global business, said Commerce Secretary Carlos Gutierrez, noting projections of a global shortfall of 40 million tons of seafood by 2030.

"We have an eight billion-dollar seafood trade deficit," he said. "We need both a strong commercial fishing industry and a robust aquaculture industry. Given the projections, there is plenty of room for both industries."

In the United States, most fish farms are land-based tanks, with a few ocean operations for shellfish such as oysters, clams and mussels. However, legislation introduced in Congress would allow the US government to issue offshore aquaculture permits and provide incentives for research and set environmental standards.

Backers of aquaculture say the business can also be a blessing for coastal communities hurt by cutbacks in fishing due to new quotas to prevent depletion of fisheries.

The push for more aquaculture has posed a dilemma for environmentalists, who worry about pollution from farms, diseases from escaped fish and other potential impacts on wild species. At the same time, most activists recognize that overfishing of wild species is a problem that can only be alleviated through increases in farming of fish.

"If it happens we want to make sure its done in the most sustainable way," said the Ocean Conservancy's Tim Eichenberg, who attended the Washington summit.

Eichenberg said strong US environmental standards could help encourage better

practices in other countries.

### 1ac Solvency

#### The plan, based on the National Sustainable Offshore Aquaculture Act, is the best way to develop environmentally sustainable offshore aquaculture. It is a product of systemic research from relevant stakeholders.

Johns, 13 --- J.D. Candidate, USC Law 2013 (March 2013, Kristen L., Southern California Law Review, FARM FISHING HOLES: GAPS IN FEDERAL REGULATION OF OFFSHORE AQUACULTURE,” 86 S. Cal. L. Rev. 681, JMP)

IV. DEVELOPING A NEW FRAMEWORK

A. Congress Should Enact New Legislation Creating a National Offshore Aquaculture Framework

A new and comprehensive framework for regulating offshore aquaculture is needed. However, there is much debate over how this can be best achieved. Some observers argue that federal agencies should use [\*713] existing statutory authorities to create an aquaculture framework, n171 while others claim that Congress should enact new legislation specifically addressing offshore aquaculture. n172 Those in favor of using existing laws claim that the MSA or National Aquaculture Act of 1980 could be tweaked to give an agency authority to develop and implement a regulatory scheme for offshore aquaculture. For instance, NOAA could continue to use its authority under MSA to approve aquaculture fishery management plans that are consistent with its new National Aquaculture Policy. n173 However, as discussed in Part III.B.3 above, NOAA's regulatory authority under the MSA in the context of aquaculture is open to challenge. To eliminate this ambiguity, some have suggested that Congress simply amend the MSA to include aquaculture as a fishing activity subject to NOAA management. However, it is unlikely that this will happen: Congress knew of NOAA's plan to regulate aquaculture under the MSA when it reauthorized the Act in 2007, yet still deliberately excluded aquaculture from the Act's definition of "fishing activities." n174

Furthermore, even if NOAA had authority under the MSA to regulate aquaculture in federal waters, as it claims, it would still not be able to enforce regulations in regions where the local Regional Fishery Council has chosen not to implement an aquaculture program into its FMP. Indeed, [\*714] most Regional Fishery Councils have classified aquaculture as a nonfishing activity outside their jurisdiction over fisheries. n175 Furthermore, the National Aquaculture Policy published by NOAA in 2011 is only meant to guide those Councils choosing to implement aquaculture programs: it has no binding effect and creates no enforceable standards or regulations on either a FMP or any private aquaculture operation. n176 Thus, the MSA - even amended - may not be the appropriate source for NOAA to base its regulatory authority over aquaculture in federal waters.

Other academics argue that the National Aquaculture Act of 1980 could be used to establish an effective regulatory framework for offshore aquaculture. This Act may be an ideal basis for regulatory authority because it is the only existing federal law specifically designed to address aquaculture. However, since its inception in 1980, the Act has failed to influence aquaculture regulation in any meaningful way. Although it created the Joint Subcommittee on Aquaculture ("JSA"), a coordinating body of several federal agencies, and charged that committee with developing a "national aquaculture plan," n177 the JSA has yet to promulgate any comprehensive regulations or even request the funds it needs to implement the plan. Furthermore, the Act places the Department of Agriculture ("DA") in charge of the JSA, an agency with little experience or expertise when it comes to marine aquaculture. It is possible that Congress could amend the Act to redesignate NOAA as the lead agency of the JSA. However, the domestic aquaculture industry is currently dominated by onshore operations - only 20 percent of U.S. farms are located in the ocean. This arguably makes the DA, given its jurisdiction over agricultural activities on land, the appropriate agency to oversee the U.S. aquaculture industry in its present form. n178 Indeed, the DA's budget for aquaculture research is much larger than NOAA's - not surprising given that onshore aquaculture operations make up a larger portion of the domestic aquaculture industry than do marine farms. n179 This makes it unlikely that the Act will be revised to identify NOAA as lead federal agency with respect to domestic aquaculture regulation.

Because of the concerns expressed above, existing statutes are not adequate bases of authority for implementing a federal regulatory [\*715] framework for offshore aquaculture. Instead, Congress should enact new legislation that explicitly creates a national regulatory framework. Below, I will discuss what a proper framework should include and describe previous attempts to implement a marine aquaculture policy. I will conclude by endorsing the National Sustainable Offshore Aquaculture Act of 2011 as the ideal piece of legislation to create such a framework.

B. What Does an Effective Regulatory Framework Look Like?

In 2003, the Pew Oceans Commission, a bipartisan, independent group of American leaders in science, fishing, conservation, government, education and business, recommended that Congress implement a "new national marine aquaculture policy based on sound conservation principles and standards." n180 Five years later, the U.S. House of Representatives Committee on Natural Resources commissioned the Government Accountability Office ("GAO") to research and report to it how to go about developing such a framework. After meeting with a wide variety of important aquaculture stakeholders and analyzing laws, regulations, and studies, the GAO identified the key issues that should be addressed in the development of effective regulation.

First, the GAO noted that identifying a lead federal agency, as well as clarifying the roles and responsibilities of other relevant federal agencies, was central to the administration of an offshore aquaculture program. n181 Specifically, most stakeholders identified NOAA as the appropriate lead federal agency because of its expertise in fisheries and oceans management. n182 Indeed, most scholars and scientists agree that NOAA is best suited for assuming the role of lead federal agency due to its long history of managing ocean resources and its unique positioning through the Regional Fishery Councils to address the user-conflict problems associated with any resource proposal. As one article put it, "There are obvious impacts on wild capture fisheries and on marine mammals which no other federal agency could more effectively evaluate." n183

The GAO also recommended that a streamlined permitting system be created to give offshore aquaculturists the legal right to occupy a given area and to establish terms and conditions for offshore aquaculture [\*716] operations. n184 Stakeholders again agreed that NOAA should be the primary agency to manage a permitting or leasing program for offshore aquaculture facilities. n185 Another important aspect of a regulatory framework was some kind of process to ensure proper management of environmental impacts, either by mandating facility-by-facility environmental review and monitoring, and / or enforcing policies mitigating the potential impacts of escaped fish and remediating environmental damage. n186 Finally, a regulatory framework must include a federal research component to help fill current gaps in knowledge about offshore aquaculture. n187

As of 2013, Congress had yet to establish by legislation any such framework. However, this is not to say that legislators have not tried. Several bills have come before the House that, if enacted, would set up a comprehensive regulatory framework for offshore aquaculture. So far, Congress has failed to take the bait.

C. Previous Attempts to Create a Framework Through New Legislation

In 2005, pressed by NOAA, Congress introduced legislation that would specifically authorize aquaculture in federal waters. The National Offshore Aquaculture Act n188 would have created a regulatory framework to allow for safe and sustainable aquaculture operations for fish and shellfish in U.S. federal waters. n189 It failed to pass, but in 2007 was reintroduced by both the Senate and the House of Representatives. The 2007 version n190 designated NOAA as the lead federal agency with respect to offshore regulation, giving it the authority to issue offshore aquaculture permits and establish environmental requirements. The Act also stressed the importance of interagency collaboration, requiring that NOAA work with other federal agencies to develop and implement a coordinated permitting process for offshore aquaculture. n191 Finally, it mandated a research and development program for all types of marine aquaculture. n192

The bill, however, was challenged by a wide array of fishing, [\*717] environmental, and consumer groups. In a letter to the House of Representatives, environmental and fishing advocacy groups including the Ocean Conservancy, Sierra Club, Institute for Fisheries Resources, Food & Water Watch, and the Pacific Coast Federation of Fishermen's Associations declared their opposition to the bill, explaining that it "appears to promote aquaculture ... at the expense of marine ecosystems and fishing communities." n193 They faulted the bill for failing to contain adequate environmental standards to eliminate or minimize the harms that aquaculture facilities pose to wild fish stock, ecosystems, water quality and habitat, marine wildlife, and endangered species and instead merely proposed that such impacts be considered and addressed to the extent necessary. In a separate report published by Food & Water Watch, the Act was criticized for including inadequate monitoring and fish-tagging provisions and lacking deficient mechanisms for enforcement and liability. n194 Further, the Act did not create a right of action for citizens to enforce the statute, a provision included in important environmental laws such as the ESA and the CWA, and contained no language to address liability for damage to the marine or human environment. n195 Ultimately, the bill failed to pass out of the Committee.

In 2009, after NOAA allowed the Gulf of Mexico Regional Fishery Management Council to implement an offshore aquaculture program despite there being no national program to regulate such projects, the National Sustainable Offshore Aquaculture Act n196 was introduced. The bill would have authorized aquaculture in federal waters, but unlike the National Aquaculture Act of 2007, it included binding environmental, socioeconomic, and liability standards. The Act would again authorize NOAA as the lead federal agency for regulation, giving it the authority to "determine appropriate locations for, permit, regulate, monitor, and enforce offshore aquaculture in the [EEZ]." n197 The Act would also require NOAA to issue legally binding national standards and regulations to prevent or minimize impacts on the marine ecosystem and fisheries. n198 Finally, it would establish a research program "to guide the precautionary [\*718] development of offshore aquaculture in the [EEZ] that ensures ecological sustainability and compatibility with healthy, functional ecosystems." n199 The bill, introduced by a congresswoman from California, was modeled off the state's Sustainable Oceans Act of 2006, which established strict aquaculture regulations. n200 Representative Capps declared that a comprehensive, commonsense framework must be created to ensure that offshore aquaculture development will proceed in an ecologically sustainable fashion, and noted, "We have a good model for doing this in my home state of California, which recently enacted landmark legislation on this topic." n201 She continued, "I believe this type of balanced, comprehensive and precautionary approach will work in California, and my legislation seeks to accomplish similar goals at the national level." n202

Her prediction may not prove far off. Interestingly, the same group of environmentalists and fishing interests that had opposed the National Offshore Aquaculture bill voiced support for the National Sustainable Offshore Aquaculture bill. Arguing that the National Offshore Aquaculture Act was defective for not including statutory criteria or legally binding environmental standards, the opponents nonetheless agreed that "some of these issues have been addressed in legislation enacted in California in 2006 (the Sustainable Oceans Act)." n203 Although the National Sustainable Offshore Aquaculture Act failed to pass in 2009, it was reintroduced in 2011 n204 just a month after NOAA issued the nation's first commercial fishing permit to Kona Blue. After its June 2011 reintroduction, the bill gained support from scientists and environmentalists: the Ocean Conservancy noted that the Act "is an opportunity to protect the U.S. from the risks of poorly regulated open ocean aquaculture." n205

[\*719]

D. The National Sustainable Offshore Aquaculture Act Is the Ideal Legislation for Creating an Effective National Regulatory Framework

The National Sustainable Offshore Aquaculture Act is the ideal legislation for creating a federal regulatory framework. The bill contains every aspect the GAO recommended that an effective framework must include. First, it creates a comprehensive framework that integrates the relevant national and state laws and regional ocean planning and management efforts. n206 This eliminates the patchwork way in which environmental laws are currently applied to offshore aquaculture, providing regulatory certainty and legitimacy to the industry while also encouraging collaboration between federal, state, and regional agencies. Second, the Act identifies one federal agency as having primary regulatory authority over offshore aquaculture, and properly designates NOAA as the lead agency to ensure environmental protection. n207

The Act also satisfies the third aspect of an effective regulatory system: a process for environmental review and monitoring. It establishes rigorous environmental standards to guide federal rulemaking and industry performances. n208 These standards address some of the major environmental concerns associated with offshore aquaculture, including fish escapes, disease, pollution, chemicals, and impacts on wildlife and predators. For instance, the Act allows fish to be cultured only if they are native to the local ecosystem and prohibits the culture of genetically modified species, decreasing the risk of harm to native fish populations in the event of escape. n209 To prevent the incidence of escape, the Act requires that all facilities "be designed, operated, and shown to be effective at preventing the escape of cultured fish into the marine environment and withstanding severe weather conditions and marine accidents." n210 Additionally, a permittee must tag or mark all cultured fish, and in the event of an escape, report the number of escaped fish and circumstances surrounding the incident to NOAA. n211 To minimize the impact of disease and pathogens on wild fish stock, the Act requires that all facilities be designed, located, and [\*720] operated to prevent the incubation and spread of disease and pathogens. n212 It also prohibits the use of antibiotics, pesticides, drugs, and other chemical treatments except where necessary to treat a diagnosed disease, and in such case only where its use is minimized to the maximum extent practicable and is approved by the Commissioner of the FDA. n213 The Act requires that NOAA consult with the EPA and other local and regional agencies to establish appropriate numerical limitations of nutrient inputs into the marine environment and that each permittee prevent discharges of pollutants into ocean waters to the maximum event practicable. n214

Finally, the Act requires NOAA to consult with other federal agencies, coastal states, Regional Fishery Management Councils, academic institutions, and other interested stakeholders to establish and conduct a research program for sustainable offshore aquaculture. n215 The program would inform NOAA "how offshore aquaculture permitting and regulation can adopt a precautionary approach to industry expansion to ensure ecological sustainability" and help it "develop cost-effective solutions to the environmental and socioeconomic impacts of offshore aquaculture." n216 This requirement is consistent with the GAO's recommendation that a framework include a research component. n217

Despite being endorsed by many environmental organizations, the National Sustainable Offshore Aquaculture bill died in the 112th Congress and was referred to the House Committee on Natural Resources, having received zero cosponsors. n218 The bill's failure may be due in part to the actions of the usual aquaculture opponents. Indeed, after the bill was first introduced in 2009, an organization of commercial fishermen sent a letter to the House of Representatives voicing its opposition, criticizing the bill for allowing "offshore aquaculture to be permitted in federal waters with limited safeguards and little or no accountability," n219 and urging the House to "develop legislation to stop federal efforts to rush growth of the offshore aquaculture industry." n220 Furthermore, NOAA has yet to publicly endorse [\*721] or even issue a position on the bill. Agencies such as NOAA and other environmental organizations must soon come forward in loud support of the bill to see that it is reintroduced and successful in Congress. If they do not, the current lack of any comprehensive regulatory regime may very well sink the entire offshore aquaculture industry.

V. CONCLUSION

The United States' attitude toward developing its offshore aquaculture industry must soon mirror its taste for seafood. The average American eats about sixteen pounds of seafood each year - the third-highest per-capita consumption rate in the world n221 - yet the nation still imports over 91 percent of its seafood products from other countries. About half of these products come from foreign aquaculture operations. In order to meet its own demand as well as become an important player in global seafood production, clearly the United States needs to step up its domestic aquaculture industry.

Marine aquaculture currently accounts for less than 20 percent of domestic aquaculture and predominately occurs in the state-owned waters close to shore. However, competition for space nearshore, along with technological developments in offshore facilities, has led to an increased interest in expanding aquaculture to federally regulated waters. While offshore development has the potential to increase U.S. aquaculture production, no comprehensive legislative or regulatory framework to manage such an expansion exists. Instead, multiple federal agencies have authority to regulate different aspects of offshore aquaculture under a variety of existing laws that were not designed for this purpose. This spotty supervision does not adequately address the potential environmental effects of offshore aquaculture and leaves each agency's basis for regulatory authority vulnerable to challenge. Furthermore, the lack of any federal policy decreases aquaculturists' incentives to take their operations offshore.

Now is the time for the federal government to take the lead in enacting a national and comprehensive regulatory framework for offshore aquaculture. The creation of such a framework is best achieved through enactment of new legislation, rather than relying on existing laws. Offshore aquaculture must be allowed to develop and grow into a thriving part of our domestic economy, but not at the expense of a healthy ocean.

#### \*\*\*The plan creates a national standard for sustainable aquaculture --- protects marine environments and prevents collapse of seafood industries

Naylor & Leonard, 10 --- \*director of the program on food security and the environment at Stanford, AND \*\*director of the aquaculture program at the Ocean Conservancy in Santa Cruz

(2/15/2010, Rosamond L. Naylor and George H. Leonard, “Aquaculture made safe,” <http://articles.latimes.com/2010/feb/15/opinion/la-oe-naylor15-2010feb15>, JMP)

While Americans' appetite for seafood continues to grow, most of us know little about where our fish comes from or how it was produced. In California, more than half of our seafood comes from aquaculture, often imported from fish farms in other countries. Just as most chickens, pigs and cows are raised in tightly confined, intensive operations, so too are many farm-raised fish.

But raising fish in tight quarters carries some serious risks. Disease and parasites can be transmitted from farmed to wild fish. Effluents, antibiotics and other chemicals can be discharged into surrounding waters. Nonnative farmed fish can escape into wild fish habitat. And a reliance on wild-caught fish in aquaculture feed can deplete food supplies for other marine life.

These environmental impacts have been evident in many other countries with intensive marine fish farming. In Chile, where industry expansion was prioritized over environmental protection, salmon aquaculture has collapsed, causing a major blow to what had been one of Chile's leading exports. Tens of thousands of people are now jobless in southern Chile, where the salmon farming industry once boomed.

If aquaculture is to play a responsible role in the future of seafood here at home, we must ensure that the "blue revolution" in ocean fish farming does not cause harm to the oceans and the marine life they support.

In December, Rep. Lois Capps (D-Santa Barbara) introduced in the House the National Sustainable Offshore Aquaculture Act, a bill that addresses the potential threats of poorly regulated fish farming in U.S. ocean waters. Her bill shares many of the features of a California state law, the Sustainable Oceans Act, which was written by state Sen. Joe Simitian (D-Palo Alto) and signed by Gov. Arnold Schwarzenegger in 2006. That legislation regulates fish farming in state waters, which extend three miles off the California coast. At present, all aquaculture operations in California and the U.S. are located just a few miles offshore.

If the U.S. and other states follow California's lead, we may be able to reward innovation and responsibility in aquaculture and at the same time prevent the kind of boom-and-bust development that happened in Chile. Unlike previous attempts to legislate fish farming at the national level, the Capps bill would ensure that U.S. aquaculture in federal waters, which extend from three to 200 miles offshore, establishes as a priority the protection of wild fish and functional ecosystems. It would ensure that industry expansion occurs only under the oversight of strong, performance-based environmental, socioeconomic and liability standards.

The bill also would preempt ecologically risky, piecemeal regulation of ocean fish farming in different regions of the U.S. Indeed, regulation efforts are already underway in many states, with no consistent standards to govern the industry's environmental or social performance. If these piecemeal regional initiatives move forward, it will get much more difficult to create a sustainable national policy for open-ocean aquaculture.

Previous federal bills introduced in 2005 and 2007 were fundamentally flawed -- and ultimately did not pass -- because they put the goal of aquaculture expansion far above that of environmental protection. Now, for the first time, a bill has been introduced that would demonstrably protect marine ecosystems, fishing communities and seafood consumers from the risks of poorly regulated open-ocean aquaculture.

The Obama administration is currently developing a national policy to guide the development of U.S. aquaculture. The administration would do well to embrace the vision articulated by Capps and Simitian for a science-based and precautionary approach to help ensure a responsible future for U.S. ocean fish farming.

#### \*\*\*Plan ensures sustainable development of aquaculture --- resolves seafood trade deficit and rebuilds wild fish stocks

Johns, 13 --- J.D. Candidate, USC Law 2013 (March 2013, Kristen L., Southern California Law Review, FARM FISHING HOLES: GAPS IN FEDERAL REGULATION OF OFFSHORE AQUACULTURE,” 86 S. Cal. L. Rev. 681, JMP)

II. WHY REGULATE NOW?

Prompt regulation of offshore aquaculture is needed for several reasons. As demand for seafood continues to increase, it is imperative that aquaculture supplements the U.S. domestic seafood supply. However, traditional U.S. aquaculture farms are no longer adequate: farms located inland or in coastal waters must compete more and more for space not only with commercial fishermen, but also with those wishing to use these waters for recreational purposes. Thus, aquaculture will inevitably move offshore from state-controlled to federally controlled waters. However, without a clear and comprehensive regulatory framework giving aquaculturists the incentives or legal assurances to operate in federal waters, developers are discouraged from taking their operations offshore. At the same time, the lack of any comprehensive regulatory framework has allowed some of the environmental risks of offshore aquaculture to go unchecked. Regulations are needed, then, to ensure not only that the industry is developed, but that it does so in a sustainable and precautionary way.

A. Aquaculture as an Important Contributor to Domestic Seafood Supply

A compelling case can be made for growing more seafood in the United States. America's appetite for seafood continues to increase n13 - yet dwindling supplies of domestic fish stocks n14 have forced the United States [\*687] to import 91 percent of its seafood. n15 Domestic aquaculture can help meet the growing demand for seafood, reduce the dependence on imports, and help rebuild wild fish stocks.

Over thirty years ago, Congress recognized the enormous potential of aquaculture for our nation's food supply. Acknowledging that traditional domestic fisheries were being harvested at unsustainable rates, that the United States imported most of its seafood, but that aquaculture contributed very little to domestic seafood production, Congress concluded that "domestic aquacultural production, therefore, has the potential for significant growth." n16 It declared aquaculture development to be in "the national interest" n17 and enacted the National Aquaculture Act of 1980 to "encourage aquaculture activities and programs in both the public and private sectors of the economy." n18 The passage of the Act undoubtedly led to an expansion of the aquaculture industry, n19 but not to the extent anticipated or hoped for. Twenty years later, when aquaculture still had not become a major player in seafood production, the Department of Commerce called for a fivefold increase in U.S. aquaculture production by 2025. n20 As of 2013, aquaculture still represents only 5 percent of the domestic seafood supply (in tons). n21 At the same time, domestic fisheries continue to be overharvested and the United States continues to rely on foreign nations for its seafood.

Like the United States, other nations have recognized the potential of aquaculture as a major food producer. Unlike the United States, however, these nations have acted to ensure that potential is realized. Worldwide, aquaculture has grown at an annual rate of 8.3 percent, "making it the fastest growing form of food production in the world." n22 Global aquaculture production is dominated by Asia, which accounts for 89 percent of production by quantity: China alone represents 62 percent of the global industry. n23 The United States ranks thirteenth in total aquaculture [\*688] production - behind countries such as Vietnam, Indonesia, India, Chile, Egypt, Japan, and Norway - despite being one of the top importers of these products. n24 Aquaculture accounts for 20 percent of the New Zealand seafood production and, with the support of the New Zealand government, has become a major export industry. n25 In Chile, with the help of the government-sponsored National Aquaculture Policy, aquaculture products represented a third of its total export volume of seafood in 2009. n26 Indeed, while global aquaculture production is valued at over $ 100 billion annually, total U.S. aquaculture production is just under $ 1 billion. n27 Thus, while the United States remains a major consumer of aquaculture products, it is still considered a minor producer on the global stage. Thirty years after the creation of the National Aquaculture Act, U.S. aquaculture still has the potential for significant growth.

B. Domestic Aquaculture Will Expand Offshore

While domestic aquaculture can play an important role in U.S. seafood production, nowhere is this potential more significant than in the offshore sector. Currently, the domestic aquaculture industry is dominated by the production of freshwater fish: of the 5 percent of the U.S. seafood supply that is attributed to aquaculture, only 20 percent occurs in saltwater. n28 Indeed, freshwater species such as catfish and trout account for the vast majority of seafood raised in U.S. fish farms. n29 Yet, demand for freshwater fish may change as Americans' tastes evolve. In 2011, for instance, the United States' main seafood import was shrimp (measured at 1.3 billion pounds and valued at $ 5.2 billion), which grows in saltwater. n30 Several other marine species made up a significant portion of U.S. imports, including salmon ($ 1.9 billion) and tuna ($ 568 million). n31 Furthermore, while catfish consumption in the United States increased only 63 percent [\*689] from 1987 to 2006, salmon consumption increased a whopping 359 percent. n32 Demand for marine aquaculture products will therefore contribute to the shift from land-based aquaculture operations to marine projects.

At the same time, the growing marine aquaculture industry will have to compete for high-quality sites in the nearshore and coastal waters typically selected for marine farms. Competition for space and use of these state-owned waters with those wishing to use these areas for recreational activities, wildlife protection, or shipping operations will only intensify, n33 making offshore sites more and more appealing. And, although such offshore operations are often more expensive because they require more durable facilities to withstand storms and surges, new technology and interest in the industry will make this industry increasingly lucrative. Due to improved technology, increasing experience, and economies of scale, costs will shrink and the economic potential for offshore aquaculture will grow. n34

Indeed, a number of U.S. aquaculturists are already experimenting with offshore technology: four projects in Hawaii, Puerto Rico, and New Hampshire involved open-ocean designs that could be viable far offshore. n35 The University of New Hampshire is currently working on technology that would allow species of mussels and scallops to be grown in far offshore facilities using special net containers suspended from floating rafts. n36 Kampachi Farms LLC (formerly "Kona Blue Water Farms," or "Kona Blue"), a Hawaii-based aquaculture company, has recently announced its [\*690] first successful harvest of fish grown in offshore waters using an innovative design that allows an unanchored cage to drift in open-ocean currents from three to seventy-five miles offshore. n37 The success of this project, the company's CEO noted, "demonstrates that we can grow fish in the open ocean with no negative impact on pristine ocean ecosystems." n38 He continued, "We must now apply ourselves to responsibly scale up this industry." n39 Optimistic about the offshore industry's development, Kampachi Farms next plans to test its design in waters six miles offshore where it can still move freely in currents while being close enough to shore for easy delivery of supplies. n40

C. Regulations Needed to Incentivize Offshore Aquaculture Developers: The Kona Blue Experience

As interest in offshore aquaculture grows, the developmental and technological barriers that were once major impediments to the industry will disappear. Now, the most significant obstacle is the lack of any clear and comprehensive regulatory framework to guide the industry's development. n41 An excellent example of this problem is illustrated by the experience of the Hawaii-based aquaculture corporation Kona Blue. n42 The company, which farms all of its yellowtail tuna in open-ocean facilities, has experienced relative success since 2001. Its high-quality tuna, along with its more "ocean-friendly" farming techniques, has gained support from consumers, n43 environmentalists, n44 and even the U.S. government. n45 [\*691] Producing over one million pounds of Kona Kampachi per year, n46 the company increased its monthly sales by 200 percent in 2007, n47 and in 2009 even served its signature tuna to President Obama and his family. n48

Kona Blue's open-ocean commercial operations, however, have so far been limited to state waters. Although its first experiment growing fish far offshore yielded a successful harvest, n49 the company's expansion into the EEZ has encountered significant challenges. According to Kona Blue CEO and cofounder Neil Sims, the most difficult aspect of launching a commercial project in federal waters is the permit process. n50 Under existing law, there is no way to obtain an aquaculture permit for operation in federal waters. Instead, aquaculturists must navigate their way through a bewildering array of authorities and jurisdictions. Several government agencies have a hand in aquaculture and can issue permits for their respective responsibilities, including the National Oceanic and Atmospheric Administration (regulating fisheries), the Army Corps of Engineers (regulating navigation), the Environmental Protection Agency (water quality), and the Food and Drug Administration (food safety) - yet no agency has the ultimate authority to issue an aquaculture permit in federal waters. n51 In fact, it is possible that an agency may simply choose not to become involved in a project's regulation or supervision. One aquaculture researcher commented that "if you were to submit an application for an aquaculture site in the EEZ, it's possible it would never be looked at by anyone." n52 At the same time, it is also possible that each [\*692] agency could assert jurisdiction over a different aspect of the operation, resulting in a disjointed and patchy administrative regime that is both costly and confusing. n53 Without a clear or defined framework that streamlines the permitting process and clarifies regulatory requirements, aquaculturists like Kona Blue looking to expand offshore seem to be swimming against the current. n54

A comprehensive federal framework for regulating the offshore industry is needed to address another significant obstacle inhibiting the industry's growth. As long as the government fails to put in place a framework that both guides offshore aquaculturists and protects their exclusive right to farm fish in federal waters, any offshore project is vulnerable to legal challenge. Kona Blue, the first company to receive a one-year federal permit from the National Marine Fishery Service ("NMFS") to farm fish in the EEZ, dealt with this very challenge in federal court. In 2011, NMFS was sued by a native Hawaiian nonprofit, KAHEA, and a consumer-rights organization, Food & Water Watch, for issuing a fishing permit to Kona Blue allowing it to operate its offshore facility in federal waters. n55 Without clear federal oversight of the industry, offshore operators like Kona Blue are left to defend their projects on a case-by-case basis. For example, Food & Water Watch, a group opposed to all aquaculture activities, has challenged individual aquaculture operations in court numerous times under various laws. n56 Other opponents of aquaculture, such as commercial and recreational fishing interests hoping not to have to compete with aquaculture, have also challenged aquaculture projects under the existing legal scheme. For instance, opponents have lobbied their respective Regional Fishery Councils, n57 which were created [\*693] by the Magnuson-Stevens Act n58 to regulate all fisheries matters in their respective regions, to keep them from implementing aquaculture programs. In 2009, aquaculture opponents sued the Gulf of Mexico Regional Fishery Council for implementing an aquaculture program into its management plan. n59 Opponents have even lobbied their congressional representatives to introduce legislation that would halt all aquaculture activities in the United States. n60

Without a comprehensive regulatory framework in place to guide the offshore industry, the attacks on aquaculture projects in federal waters such as those proposed in the Gulf of Mexico or launched by Kona Blue will not stop. Aquaculturists must be given the incentives and legal assurances needed to expand offshore, or else they will move their operations abroad. Indeed, frustrated by the lack of any clear or predictable regulatory or permitting framework, companies such as Kona Blue are already starting to take their offshore operations overseas. Although most express their wish to stay in U.S. waters, they admit it makes more sense to move to an area that has clear and predictable management. n61 Indeed, would-be investors and lenders interested in offshore operations are suspicious of investing in activities in the United States given the industry's uncertain future, and would rather finance foreign operations: U.S. investors have already contributed to offshore operations in areas off the Caribbean and Latin America. n62 Kona Blue recently chose to expand its operations from waters [\*694] off Hawaii to Mexico; n63 another offshore aquaculturist recently moved his business from U.S. waters off the coast of Puerto Rico to Panama. n64 As Kona Blue's CEO explained,

The concern going forward is the permit pathway ... . If you make it available, [entrepreneurs] will come and make investments. American entrepreneurs realize an opportunity when they see one. The biggest constraint we hear from them is, "Will we be allowed to scale this [up]? How can we be sure that we can build an industry here?" n65

Thus, if the U.S. government wishes to keep its domestic offshore aquaculture industry afloat, it must focus on revising its current regulatory regime.

## Seafood Imports Adv

### AT: SQ Policy Increases Aquaculture

#### The absence of a regulatory framework is blocking U.S. development of ocean aquaculture

Luening, 13 (1/2/2013, Erich, “Obama's First Term Aquaculture Successes,” <http://marthasvineyard.patch.com/groups/erich-luenings-blog/p/bp--obamas-first-term-aquaculture-successes>, JMP)

PULL OUT BLURB:

Neil Sims, founder and executive of Oceans Stewards Institute and founder and owner of Kampachi Farms in Hawaii.

“The biggest thing accomplished over the last four years was developing a regulatory framework under the national [aquaculture] policy. NAP is a good start, but they have to go out and establish a regulatory framework. Why has it taken four years to do this? States have offshore aquaculture regulations of their own. What have they been doing? The entire industry has been sitting here waiting. I know academics can’t get funding for their aquaculture research because they are told ‘your just gonna just ship it over seas.’ I think NAP is a start but it hasn’t turned into a regulatory framework.

“Let NOAA regulate the industry with their fish biologists. They seem to think that sustainably raised seafood will just arrive from farms over seas and without our environmental standards.”

#### Constraints preventing growth in current aquaculture

Jolly, 11 (1/31/2011, David, “Fish Farming Overtaking Traditional Fisheries,” <http://www.nytimes.com/2011/02/01/business/global/01fish.html?_r=1&>, JMP)

PARIS — Aquaculture is overtaking traditional fisheries in global production, the Food and Agriculture Organization said Monday, but a scientist with the organization, a United Nations body, said that the practice could not continue growing indefinitely at the current pace.

Fish farming is the fastest growing area of animal food production, increasing at a 6.6 percent annual rate from 1970 to 2008, the F.A.O. said in a report, State of World Fisheries and Aquaculture 2010. Over that period, the global per capita supply of farm-raised fish rose to 7.8 kilograms, or 17.2 pounds, from 0.7 kilogram.

“We’re going to run into constraints,” Kevern Cochrane, director of the F.A.O.’s resources use and conservation division and a contributor to the report, said by telephone, “in terms of space availability, water availability — particularly fresh water — and also environmental impacts and supply of feed.”

“Growth is not sustainable indefinitely at that level,” he said, “and we are currently seeing a reduction in the annual rate of increase.”

Aquaculture now makes up 46 percent of the world’s food-fish supply in volume terms, up from 43 percent in 2006, according to the report, and appeared to have overtaken wild fisheries in dollar value, at $98.4 billion in 2008 compared with $93.9 billion. The increasing share of aquaculture in the overall picture shows that “in terms of capture fisheries, we’ve now more or less peaked” at the current 90 million tons of annual harvest, Mr. Cochrane said. “That is probably the limit of what we can get from sustainably harvested fisheries.

“The challenge to fishing countries is to ensure that capture fisheries production is sustained at its current levels, but with healthy stocks,” he said. “If that production begins to decline, it is a sign that we’re failing in effective management.”

#### U.S. aquaculture industry lagging in many areas

Howell, et. al, 14 --- PhD, Project Director of Report and Research Director for Future of Fish (1/15/2014, Colleen, Future of Fish, “Breakthrough Aquaculture: Uncovering solutions that drive ecologically sound and commercially viable models for farm-raised seafood,” <http://www.futureoffish.org/sites/default/files/docs/resources/Aquaculture_Report_FoF_2014.pdf>, JMP)

Aquaculture takes place in nearly every country in the world, and for some cultures has been practiced for millennia. Yet, in the US, fish farming is a relatively small and nascent industry, accounting for less than 1% of global production. Of the farmed fish consumed domestically, 90% is imported. Due to a number of economic, ecological, social, and regulatory issues, the US aquaculture industry has lagged behind the rest of the world in terms of new technology, business-friendly policies, cutting-edge research, public and private investment, and mature market demand.

#### SQ not boosting fin fish aquaculture

Luening, 13 (1/2/2013, Erich, “Obama's First Term Aquaculture Successes,” <http://marthasvineyard.patch.com/groups/erich-luenings-blog/p/bp--obamas-first-term-aquaculture-successes>, JMP)

**\*\*\*Note --- Dr. Michael Rubino is the Director of Aquaculture at the NOAA**

Policy components

“Coming out of the policy, we asked what can we do under the current funding limitations? Three things, because we are on the marine side ... oysters, clams, muscles, and fin fish. Aquaculture also works towards fishery restoration--from salmon on the pacific coast and oysters on the East,” Rubino said.

The shellfish industry came out strongly on saying they were the here in the now as far as marine aquaculture goes because so much legislative hurdles still exist until fin fish farming in marine waters can get going, he added.

“A major component of our work is in the National Shellfish Initiative,” said Rubino. “And it must be a regional approach.”

### Regulatory Barriers Blocking Aquaculture

#### Regulatory inconsistency deters ocean aquaculture

Knapp, 12 --- Professor of Economics at the Institute of Social and Economic Research, University of Alaska Anchorage (Gunnar, “The Political Economics of United States Marine Aquaculture,” <http://www.fra.affrc.go.jp/bulletin/bull/bull35/35-7.pdf>, JMP)

Examples of Unfavorable Leasing and Regulatory Policies for U.S. Marine Aquaculture

　U.S. marine aquaculture leasing and regulatory policies cannot be characterized in terms of any particular policy of any particular agency. They constitute a very wide range of policies of multiple agencies at federal, state and local levels, which differ widely for different types of marine aquaculture in different states and regions. However, it seems reasonable to conclude that the combined effect of these policies has been to make many kinds of marine aquaculture difficult or impossible in large parts of the United States. Here are some examples:

Alaska finfish farming ban: Although Alaska accounts for more than half of United States capture fisheries production and more than half of the United States coastline, all finfish farming is banned by the State of Alaska.1

Absence of enabling regulatory mechanism for federal waters: There is no enabling regulatory mechanism for marine aquaculture in federal waters (generally defined as more than three miles offshore). There is no way to apply for or obtain leases to farm fish in federal waters.

Regulatory complexity, consistency and delays: Fish farmers face numerous complex, inconsistent, shifting, and time-consuming regulatory requirements. Consider this description by a representative of a major U.S. shellfish farming company based in Washington of challenges faced by the company in obtaining leases:

　　[One challenge] facing his company and the production of shellfish in the United States is the Army Corps of Engineers’ Nationwide Permit 48. Although issued in March 2007, it has yet to be implemented in the Pacific Northwest, and is resulting in inconsistent application in the other shellfish producing states. In addition, there are delays in ESA/MSA consultations and other certification requirements. One of the results of these bureaucratic inactions is that his firm is still waiting － after 15 years － to get a site license in Washington State. These delays have forced the company to purchase leases in Canada, where production has begun and 100 people are employed. Another reason for these delays is that the State of Washington’s Shoreline Master Program is being updated. It includes new regulations on the growing of geoducks, a saltwater clam with which [the company] wants to expand its production (United Soybean Board-Aquaculture Industry Coalition, 2011).

　In a survey of U.S. molluscan shellfish growers (who account for about two-thirds of U.S. marine aquaculture), Rioux (2011) found that growers perceived significantly higher institutional risks associated with regulation and leasing than risks associated with markets, the environment, or climate. She noted, “through discussions with growers as well as their answers to [an] open ended question, the tie that makes all state and local regulations, regardless of the state or local, the highest risk is the rate at which they are changed. Growers find that state and local regulations are constantly changing and it is difficult to keep up with them.”

#### Fragmented regulatory framework prevents development of ocean aquaculture

Knapp, 12 --- Professor of Economics at the Institute of Social and Economic Research, University of Alaska Anchorage (Gunnar, “The Political Economics of United States Marine Aquaculture,” <http://www.fra.affrc.go.jp/bulletin/bull/bull35/35-7.pdf>, JMP)

5. The governance system for leasing and regulation is structurally biased against U.S. marine aquaculture: The governance system for U.S. marine aquaculture leasing and regulation consists of the processes by which leasing and regulatory policies are developed by the agencies that have authority to develop policies, and how they make those policies. For purposes of discussion, we may define a hypothetical unbiased governance system as one that would develop policies based on an objective consideration of the best interests and/or preferences of society as a whole, balancing both costs and benefits. For several structural reasons, the U.S. governance system is likely to be less favorable toward aquaculture than an unbiased governance system would be.

　One reason is that leasing and regulatory authority for U.S. marine aquaculture is fragmented among multiple branches of government (executive, legislative, and judicial) at multiple levels of jurisdiction (local, state, and federal agencies). Federal agencies with leasing or regulatory authority for marine aquaculture include, but are not limited to the National Marine Fisheries Service, the Army Corps of Engineers, the Environmental Protection Agency, the Fish and Wildlife Service, the Department of Agriculture, and the Food and Drug Administration. Similarly, at the state level, environmental and fisheries agencies typically have regulatory authority. Local governments may exercise additional authority, such as zoning regulations. In the legislative branch, the U.S. Congress and state legislatures enact laws affecting aquaculture, and many issues are decided by the courts at both the state and federal levels.

　Several structural biases against aquaculture result from this fragmented governance system. One bias is that most agencies have a limited focus. Rather than considering the best interests and/or preferences of society as a whole, or balancing both costs and benefits of marine aquaculture, they are charged with more narrow and specific goals, such as protecting water quality or promoting economic development. Even though some agencies may be charged with considering the benefits of marine aquaculture, this does not result in an unbiased governance system. A single agency － at any level － can stop marine aquaculture even if all other agencies are willing or eager to promote it. For example, if a single agency establishes impossible water quality regulations or simply takes too long to decide what the regulations will be, it can stop or indefinitely delay aquaculture investments.

　A second structural bias is that agencies may be biased internally against aquaculture. For example, fisheries management agencies may be strongly influenced by constituents who oppose aquaculture, such as fishermen. Their staff may have little interest in or knowledge of aquaculture, or may actively oppose it. This is particularly likely to be the case because aquaculture is new and small, so regulatory jurisdiction is typically within agencies established to regulate and promote older and larger industries.

　A third structural bias is that agency budgets for aquaculture leasing and regulation are limited. When budgets are limited, agencies do less. But U.S. marine aquaculture can only develop if agencies are proactive in developing enabling leasing and regulatory frameworks. Doing less will delay the development of marine aquaculture.

### Seafood Trade Deficit Now

#### 9 billion dollar seafood trade deficit now

ENS, 11 (6/13/2009, Environmental News Service, “Obama Administration Promotes Aquaculture in U.S. Waters,” <http://ens-newswire.com/2011/06/13/obama-administration-promotes-aquaculture-in-u-s-waters/>, JMP)

WASHINGTON, DC, June 13, 2011 (ENS) – The United States needs to stop buying so much farm-raised fish from other countries and start producing its own, the Obama administration officials said Friday, releasing the first set of national sustainable marine aquaculture policies.

Foreign aquaculture accounts for about half of the 84 percent of seafood imported by the United States, contributing to the $9 billion trade deficit in seafood, said Commerce Secretary Gary Locke.

“Our current trade deficit in seafood is approximately $9 billion,” said Locke. “Encouraging and developing the U.S. aquaculture industry will result in economic growth and create jobs at home, support exports to global markets, and spur new innovations in technology to support the industry.”

“Sustainable domestic aquaculture can help us meet the increasing demand for seafood and create jobs in our coastal communities,” said NOAA Administrator Jane Lubchenco, PhD. “Our vision is that domestic aquaculture will provide an additional source of healthy seafood to complement wild fisheries, while supporting healthy ecosystems and coastal economies.”

Global wild fisheries are in decline, with habitat such as estuaries in critical condition.

### Aquaculture Solves Seafood Trade Deficit

#### Expanding ocean aquaculture solves seafood trade deficit

U.S. Commission on Ocean Policy, 04 (4/20/2004, Preliminary Report, “CHAPTER 22: SETTING A COURSE FOR SUSTAINABLE MARINE AQUACULTURE,”

<http://govinfo.library.unt.edu/oceancommission/documents/prelimreport/chapter22.pdf>, JMP)

ACKNOWLEDGING THE GROWING SIGNIFICANCE OF MARINE AQUACULTURE

As traditional harvest fisheries have approached and exceeded sustainable levels, the farming of fish, shellfish, and aquatic plants in marine and fresh waters has become a burgeoning global industry. These animals can be raised in everything from nearly natural environments to enclosed structures, such as ponds, cages, and tanks, where they are fed and treated to maximize their growth rate.

In the United States, the demand for seafood continues to grow as expanding numbers of Americans seek healthier diets. During the 1980s and 1990s, the value of U.S. aquaculture production rose by about 400 percent, to almost $1 billion. This figure includes freshwater and marine finfish and shellfish, baitfish, and ornamental fish for sale to aquariums.1 Along with fish farmers themselves, the aquaculture industry supports an infrastructure of feed mills, processing plants, and equipment manufacturers. There is great potential for marine aquaculture to become an even more important source of seafood for the U.S. market and a way to help reduce the nation’s seafood trade deficit of $7 billion a year (Figure 22.1).2

### AT: Economic Decline Doesn’t Cause War

#### Economic decline triggers worldwide conflict **Royal, 10** – Jedediah Royal, Director of Cooperative Threat Reduction at the U.S. Department of Defense, (Economic Integration, Economic Signaling and the Problem of Economic Crises, Economics of War and Peace: Economic, Legal and Political Perspectives, ed. Goldsmith and Brauer, p. 213-215)

Less intuitive is how periods of economic decline may increase the likelihood of external conflict. Political science literature has contributed a moderate degree of attention to the impact of economic decline and the security and defence behaviour of interdependent states. Research in this vein has been considered at systemic, dyadic and national levels. Several notable contributions follow. First, on the systemic level, Pollins (2008) advances Modclski and Thompson's (1996) work on leadership cycle theory, finding that rhythms in the global economy are associated with the rise and fall of a pre-eminent power and the often bloody transition from one pre-eminent leader to the next. As such, exogenous shocks such as economic crises could usher in a redistribution of relative power (see also Gilpin, 1981) that leads to uncertainty about power balances, increasing the risk of miscalculation (Fearon. 1995). Alternatively, even a relatively certain redistribution of power could lead to a permissive environment for conflict as a rising power may seek to challenge a declining power (Werner, 1999). Separately, Pollins (1996) also shows that global economic cycles combined with parallel leadership cycles impact the likelihood of conflict among major, medium and small powers, although he suggests that the causes and connections between global economic conditions and security conditions remain unknown. Second, on a dyadic level, Copeland's (1996. 2000) theory of trade expectations suggests that 'future expectation of trade' is a significant variable in understanding economic conditions and security behaviour of states. He argues that interdependent states are likely to gain pacific benefits from trade so long as they have an optimistic view of future trade relations. However, if the expectations of future trade decline, particularly for difficult to replace items such as energy resources, the likelihood for conflict increases, as states will be inclined to use force to gain access to those resources. Crises could potentially be the trigger for decreased trade expectations either on its own or because it triggers protectionist moves by interdependent states.4 Third, others have considered the link between economic decline and external armed conflict at a national level. Blomberg and Hess (2002) find a strong correlation between internal conflict and external conflict, particularly during periods of economic downturn. They write: The linkages between internal and external conflict and prosperity are strong and mutually reinforcing. Economic conflict tends to spawn internal conflict, which in turn returns the favour. Moreover, the presence of a recession tends to amplify the extent to which international and external conflicts self-reinforce each other. (Blomberg & Hess, 2002. p. 89) Economic decline has also been linked with an increase in the likelihood of terrorism (Blomberg. Hess. & Weerapana. 2004). which has the capacity to spill across borders and lead to external tensions. Furthermore, crises generally reduce the popularity of a sitting government. 'Diversionary theory' suggests that, when facing unpopularity arising from economic decline, sitting governments have increased incentives to fabricate external military conflicts to create a 'rally around the flag' effect. Wang (1990, DeRouen (1995). and Blomberg, Hess, and Thacker (2006) find supporting evidence showing that economic decline and use of force are at least indirectly correlated. Gelpi (1997), Miller (1999), and Kisangani and Pickering (2009) suggest that the tendency towards diversionary tactics are greater for democratic states than autocratic states, due to the fact that democratic leaders are generally more susceptible to being removed from office due to lack of domestic support. DeRouen (2000) has provided evidence showing that periods of weak economic performance in the United States, and thus weak Presidential popularity, are statistically linked to an increase in the use of force. In summary, recent economic scholarship positively correlates economic integration with an increase in the frequency of economic crises, whereas political science scholarship links economic decline with external conflict at systemic, dyadic and national levels.' This implied connection between integration, crises and armed conflict has not featured prominently in the economic-security debate and deserves more attention. This observation is not contradictory to other perspectives that link economic interdependence with a decrease in the likelihood of external conflict, such as those mentioned in the first paragraph of this chapter. Those studies tend to focus on dyadic interdependence instead of global interdependence and do not specifically consider the occurrence of and conditions created by economic crises. As such, the view presented here should be considered ancillary to those views.

#### **Economic decline undercuts interdependence and triggers nuclear conflict**

Kemp ’10 [Geoffrey Kemp, Director of Regional Strategic Programs at The Nixon Center, served in the White House under Ronald Reagan, special assistant to the president for national security affairs and senior director for Near East and South Asian affairs on the National Security Council Staff, Former Director, Middle East Arms Control Project at the Carnegie Endowment for International Peace, 2010, The East Moves West: India, China, and Asia’s Growing Presence in the Middle East, p. 233-4]

The second scenario, called Mayhem and Chaos, is the opposite of the first scenario; everything that can go wrong does go wrong. The world economic situation weakens rather than strengthens, and India, China, and Japan suffer a major reduction in their growth rates, further weakening the global economy. As a result, energy demand falls and the price of fossil fuels plummets, leading to a financial crisis for the energy-producing states, which are forced to cut back dramatically on expansion programs and social welfare. That in turn leads to political unrest: and nurtures different radical groups, including, but not limited to, Islamic extremists. The internal stability of some countries is challenged, and there are more “failed states.” Most serious is the collapse of the democratic government in Pakistan and its takeover by Muslim extremists, who then take possession of a large number of nuclear weapons. The danger of war between India and Pakistan increases significantly. Iran, always worried about an extremist Pakistan, expands and weaponizes its nuclear program. That further enhances nuclear proliferation in the Middle East, with Saudi Arabia, Turkey, and Egypt joining Israel and Iran as nuclear states. Under these circumstances, the potential for nuclear terrorism increases, and the possibility of a nuclear terrorist attack in either the Western world or in the oil-producing states may lead to a further devastating collapse of the world economic market, with a tsunami-like impact on stability. In this scenario, major disruptions can be expected, with dire consequences for two-thirds of the planet’s population.

## Sustainability Adv

### Unsustainable Aquaculture Undermines Ocean Env / Industry

#### Aquaculture growing exponentially globally but if done without protections it will destroy ocean ecosystems

Howell, et. al, 14 --- PhD, Project Director of Report and Research Director for Future of Fish (1/15/2014, Colleen, Future of Fish, “Breakthrough Aquaculture: Uncovering solutions that drive ecologically sound and commercially viable models for farm-raised seafood,” <http://www.futureoffish.org/sites/default/files/docs/resources/Aquaculture_Report_FoF_2014.pdf>, JMP)

The ocean is the largest source of wild food on the planet, and demand for fish is ever on the rise. Seafood provides critically important animal protein to an estimated three billion people. Unfortunately, the seas are unable to sustain current consumption needs—much less future ones—as fish populations are already fished to their limits. Thirty percent of wild fisheries are actively overharvested or significantly depleted, and 90% of the biggest fish are gone. Myriad issues related to bycatch, illegal fishing, mislabeling, forced labor, and habitat-damaging gear further complicate the future of fish.

In order to keep pace with the escalating need for more seafood, the world must rely increasingly on aquaculture. Aquaculture has for many years been the fastest-growing food production system on the planet, and it has expanded by a factor of 12 since 1980. Taking place in approximately 190 countries and involving cultivation of roughly 600 species—from salmon to oysters to sea urchins—aquaculture supplies more than half of all seafood produced for human consumption.

Despite its prevalence and importance as an alternative to wild fish, aquaculture is not without problems. Some forms of conventional fish farming are associated with serious ecological damage related to fish feed, water pollution, habitat loss, antibiotic use, genetic contamination, land conversion, and ecosystem disruption, as well as high rates of freshwater and energy consumption. In addition, some farming methods expose workers to unsafe levels of disinfectants and other chemicals used to treat disease, clean ponds, and process products.

### Current Fishing Practices Destroy Environment

#### Current seafood extraction methods are unsustainable AND wreck marine ecosystems.

Howell, et. al, 14 --- PhD, Project Director of Report and Research Director for Future of Fish (1/15/2014, Colleen, Future of Fish, “Breakthrough Aquaculture: Uncovering solutions that drive ecologically sound and commercially viable models for farm-raised seafood,” <http://www.futureoffish.org/sites/default/files/docs/resources/Aquaculture_Report_FoF_2014.pdf>, JMP)

EXECUTIVE SUMMARY

More than three billion people on the planet depend on seafood for a critical portion of their diet’s protein. In the US, we import nearly 90% of our seafood, reaching across the globe to the waters of developing nations to buy their tastiest and most exotic fish. Worldwide, the voracious appetite for fish has shamefully depleted our oceans, overexploiting stocks and destroying marine habitats. To keep pace with the growing demand for seafood—predicted to rise 8% during the next decade—the world must increasingly rely on aquaculture, the farming of fish.

### AT: Overfishing Declining

#### Still overfishing around the world --- U.S. fish imports compound the problem

Brewer, 14 --- Masters in Social Work From Colombia University (5/20/2014, Reuben, “You Want to Save the Environment? Forget the U.S. and Look at China and India,” <http://www.fool.com/investing/general/2014/05/20/you-want-to-save-the-environment-forget-the-us-and.aspx>, JMP)

A good example

The United States has been through the industrialization process now taking place in countries like China and India. To be sure, they've learned a great deal from our travails. However, these nations are going to go through their own troubles as they push through what is a difficult transition.

That's one of the reasons why it's important for the United States to take a leadership role on the environment. However, the United States can't be the environmental good guy without consideration to the rest of the world.

A good example of this is the fishing industry. U.S. fisheries are heavily regulated and have been bouncing back from past overfishing. However, the United States imports around 90% of its seafood, and the rest of the world hasn't been as strict. Meaning fisheries around the world are still being over-fished. What good has the U.S. effort done when looking at the world's fish population? Sadly, not much.

#### Still overfishing in rest of world and U.S. imports fish from those areas

Plumer, 14 (5/8/2014, Brad, “How the US stopped its fisheries from collapsing,” <http://www.vox.com/2014/5/8/5669120/how-the-us-stopped-its-fisheries-from-collapsing>, JMP)

That said, the rest of the world isn't doing as well

Now the big caveat: Yes, US fisheries seem to be recovering. But that's not true for much of the rest of the world. And, given that the United States imports around 91 percent of its seafood, this is a pretty crucial caveat.

All told, the best-managed fisheries around the world — the United States, Canada, Australia, New Zealand, Norway, Iceland — only make up about 16 percent of the global catch, according to a recent paper in Marine Pollution Bulletin by Tony Pitcher and William Cheung of the University of British Columbia.

#### Overfishing driving extinction of marine life

McCutcheon, 14 (3/27/2014, Jody, “Something Fishy? Aquaculture and the Environment,” <http://eluxemagazine.com/magazine/theres-something-fishy-aquaculture/>, JMP)

Seafood surprise, anyone?

Fish is perceived as a low-fat, heart-healthy protein source, and as such, demand for it has skyrocketed. In just five decades, average yearly per-person seafood consumption has risen worldwide by 70%, from 22 pounds to over 37 pounds, largely thanks to high-protein diet trends like Atkins; the global spread in popularity of sushi, and increased wealth allowing more people to spend money on meat and fish.

However, over that same time, Atlantic salmon have been fished to the brink of extinction, while according to the United Nations, upwards of 90% of large fish like tuna and marlin have been fished out of sustainability, and 32% of all wild fishery stocks have been overexploited. Several scientific reports now suggest the threat of extinction for marine life is at an “unprecedented” level, in part due to overfishing.

#### Natural fisheries are in steep decline --- boosting aquaculture is necessary to ensure stable seafood supply

Corbin, 10 --- President of Aquaculture Planning & Advocacy LLC (May/ June 2010, John S., Marine Technology Society Journal, “Sustainable U.S. Marine Aquaculture Expansion, a Necessity,” ingentaconnect database, JMP)

In recent years, the scientific literature has contained numerous dire and controversial descriptions of the increasing decline of the oceans’ well-documented, finite yield of seafood and its essential contribution to human nutritional well-being. Important marine ecosystems and fish populations may in fact be exhaustible, or at the least damaged beyond recovery by human activity (Myers and Worm, 2003; Pauly and Palomares, 2005; Pauly, 2009). Evidence indicates that many of the world’s major fisheries are being pushed beyond sustainable yields by excessive fishing pressure and overstressed by loss of critical habitat through pollution, natural and man-made disasters, and the emerging specter of the impacts of global climate change (Mora et al., 2009; Food and Agriculture Organization [FAO], 2009a; FAO, 2009b). Expansion of capture fishery supplies for a fish-hungry world is deemed unlikely by most scientists, and aquaculture1 is widely viewed as one solution (albeit a partial solution) to increase global seafood availability to meet the inevitable growth in demand from an expanding population (FAO, 2009b).

Despite these awakening realizations and the potentially highly disruptive impacts on the American seafood industry, U.S. domestic aquaculture development in recent years has slowed and currently contributes very little to American seafood consumption. U.S. scientists, government policy makers, and a diverse array of stakeholders (proponents and opponents) continue to debate the desirability of investing in expanding domestic sources of seafood through marine aquaculture and aquaculture-enhanced fisheries in the face of the complex economic and social challenges facing America today (U.S. Department of Commerce [USDOC], 2007).

In this unsettling climate, it is timely to consider the recent history and current status of American seafood consumption and supply and review projected product needs and the issues in meeting those needs in the next 10 to 20 years. The growing importance of the culture of macroalgae (seaweed) and microalgae to future world seafood and energy supplies must be noted; however, these sources are not primary topics in this discussion (Forster, 2008; Roesijadi et al., 2008). Fortunately, the United States has a diverse and experienced domestic fishing industry and a fledgling marine aquaculture sector on which to craft solutions. Ongoing discussions by the federal government and Congress are also reviewed in the context of America’s expansive ocean resources in its enormous Exclusive Economic Zone (EEZ). The major issues constraining the greater ocean use for expanded and sustainable2 domestic seafood production are discussed, and recommendations for immediate action are considered.

### AT: Ocean Alt Causes / Overfishing Decreasing \*\*\*

**Overfishing is the root cause of ocean decline --- undermines resilience**

Rader, 14 --- Environmental Defense Fund's chief ocean scientist (2/26/2014, Douglas, “Trending: Concern for ocean health and the resources to help,” <http://www.edf.org/blog/2014/02/26/trending-concern-ocean-health-and-resources-help>, JMP)

Last week, a CBS news story highlighting a 2006 study on the decline of oceans' health, was rediscovered and began trending on Facebook. With the study back in the spotlight, I was delighted to join lead author Dr. Boris Worm on HuffPo Live to discuss the study’s findings and solutions for improving the state of our oceans.

While great strides have been made in the eight years since the study was written, overall oceans' health continues to decline. Globally, nearly two-thirds of fisheries are in trouble with pollution, overfishing, and habitat loss all continuing to pose a very real threat to oceans and their resilience in the face of new threats, including climate change and ocean acidification.

Overfishing: The root cause of oceans decline

During our talk, Dr. Worm and I discussed these issues and took a deeper dive into the root cause of oceans decline—overfishing. The world’s population is rising steadily and is estimated to reach about 8 billion people by 2024 and 9 billion by 2040. As the population increases, so too does the world’s appetite for seafood. As a result, fish are taken out of the ocean faster than they can reproduce. This can cause obvious problems up to and including extinction of especially vulnerable species (thus the catchy but grim headline on the HuffPo story, “Scientists Predict Salt-Water Fish Extinction”).

Frankly, extinction is not the biggest problem. Overfishing reduces the abundance of vulnerable species, but it also alters ecosystem structure and function, as other species react to the reduced abundance through what ecologists call “ecological cascades.” Valuable large fish that help maintain stable ocean ecosystems can be replaced by more opportunistic, “weedy” species. Under severe fishing pressure, the ability of marine food webs to sustain themselves can be compromised – a real problem with the challenges that lie ahead from climate change.

When our oceans suffer, we do too. Overfishing affects the three billion people around the world who rely on seafood as a source of protein and millions more that depend on healthy fisheries for their livelihoods. Furthermore, poor management costs the world’s fisheries $50 billion annually.

#### Overfishing is the greatest threat to global marine ecosystems

Levitt, 13 (3/27/2013, Tom, “Overfished and under-protected: Oceans on the brink of catastrophic collapse,” <http://www.cnn.com/2013/03/22/world/oceans-overfishing-climate-change/index.html>, JMP)

(CNN) -- As the human footprint has spread, the remaining wildernesses on our planet have retreated. However, dive just a few meters below the ocean surface and you will enter a world where humans very rarely venture.

In many ways, it is the forgotten world on Earth. A ridiculous thought when you consider that oceans make up 90% of the living volume of the planet and are home to more than one million species, ranging from the largest animal on the planet -- the blue whale -- to one of the weirdest -- the blobfish.

Remoteness, however, has not left the oceans and their inhabitants unaffected by humans, with overfishing, climate change and pollution destabilizing marine environments across the world.

Many marine scientists consider overfishing to be the greatest of these threats. The Census of Marine Life, a decade-long international survey of ocean life completed in 2010, estimated that 90% of the big fish had disappeared from the world's oceans, victims primarily of overfishing.

Tens of thousands of bluefin tuna were caught every year in the North Sea in the 1930s and 1940s. Today, they have disappeared across the seas of Northern Europe. Halibut has suffered a similar fate, largely vanishing from the North Atlantic in the 19th century.

Opinion: Probing the ocean's undiscovered depths

In some cases, the collapse has spread to entire fisheries. The remaining fishing trawlers in the Irish Sea, for example, bring back nothing more than prawns and scallops, says marine biologist Callum Roberts, from the UK's York University.

"Is a smear of protein the sort of marine environment we want or need? No, we need one with a variety of species, that is going to be more resistant to the conditions we can expect from climate change," Roberts said.

### Aquaculture Key to Global Food Supply \*\*\*

#### Other food sources will become increasing constrained --- seafood key to global protein supply

Kite-Powell, 11 --- aquaculture policy specialist at Woods Hole Oceanographic Institution (9/21/2011, Hauke, interview by Kate Madin, “Where Will We Get Our Seafood? Unlike the rest of the world, the U.S. has not embraced aquaculture,” http://www.whoi.edu/oceanus/feature/where-will-we-get-our-seafood, JMP)

Why did you bring this group together for a colloquium?

Kite-Powell: The main motivation for me was the stalemate in the U.S. over aquaculture in federal waters. It's a question of thinking about future international competition for food production resources. We're starting to hear a lot about impending fresh water constraints in many parts of the world, and the limits of the productivity of land-based agricultural resources. Seafood is likely to play a more important role in global protein supply in the future than it does today.

People here in New England like the quaint lobster boat, and there's nothing wrong with artisanal fisheries. In many places around the world, they’re a key piece of the local social fabric. But that's not where the solution to our food supply problems is going to come from.

Could we as a country meet all our domestic seafood needs with aquaculture?

Kite-Powell: There's no ecological or environmental reason why we couldn't match our consumption with production.

#### Aquaculture increases key to feed growing population

Jolly, 11 (1/31/2011, David, “Fish Farming Overtaking Traditional Fisheries,” <http://www.nytimes.com/2011/02/01/business/global/01fish.html?_r=1&>, JMP)

About 32 percent of world fish stocks are overexploited, depleted or recovering and need to be urgently rebuilt, according to the report. Nonetheless, people are eating more fish, thanks to aquaculture: The report showed that global fish consumption rose to a record of almost 17 kilograms a person.

Wally Stevens, executive director of the Global Aquaculture Alliance, a trade association, said Monday that the industry’s target actually was to increase the annual output of the aquaculture industry 7 percent.

“Our attitude is that aquaculture production must double in the next 10 years to keep pace with global demand, and in particular the changes in demand coming from growth in middle-class populations in developing nations,” he said.

Fish can be raised in tanks and ponds, and — with the aid of cages or nets — in oceans, lakes or rivers. With most of the world’s fisheries operating at or above their sustainable yields, aquaculture is seen as the only way to increase the supply of fish in a world hungry for protein.

#### Aquaculture growing source of food production --- less energy and land intensive

McCutcheon, 14 (3/27/2014, Jody, “Something Fishy? Aquaculture and the Environment,” <http://eluxemagazine.com/magazine/theres-something-fishy-aquaculture/>, JMP)

Aquaculture: Pros and Cons

Enter aquaculture to bridge the gap between voracious demand and unsustainable supply. A practice that began thousands of years ago in Asia has evolved into a $78 billion industry, with almost half of the seafood we eat coming from aquaculture. In the last few decades, in fact, aquaculture has become the fastest-growing method of food production. The UN estimates the industry has grown 600% in twenty years, to the point where the UN and US Department of Agriculture agree that farmed-fish production has now surpassed beef production worldwide.

One benefit of aquaculture is it can be less energy-intensive than land-based farming. Compared to land animals, fish are more efficient at converting feed to mass. Farmed Atlantic salmon are said to be most efficient, with a feed conversion ratio (FCR) close to 1:1, although that’s at the lower end of the spectrum compared to tilapia and catfish, both of which have FCR’s around 2:1. To compare, poultry’s FCR is roughly 2.5:1, while that of beef cattle is over 6:1. Less energy-intensive doesn’t mean more eco-friendly, though, as we’ll soon see.

### AT: Food Security Improving

#### Food security is still fragile --- significant risks remail

Financial Times, 5/28 (“Boost for global food security,” 5/28/2014, <http://blogs.ft.com/the-world/2014/05/boost-for-global-food-security/>, JMP)

But last year’s food security gains are fragile and progress is threatened by:

• low spending on agricultural research

• high agricultural import tariffs that push up domestic food prices

• insufficient iron-related nutrients

“Overall food security improved this year but significant risks remain”, says Leo Abruzzese, the EIU’s global director of forecasting and public policy. “Food prices should continue to fall, although not as much as in recent years, and the El Niño weather event may reduce agricultural output over the next few years, which could weigh on global food security”.

### Oceans Key to Survival

#### Destruction of ocean environment will cause extinction

Sielen, 13 --- Senior Fellow for International Environmental Policy at the Center for Marine Biodiversity and Conservation at the Scripps Institution of Oceanography (Nov/Dec 2013, Alan B., Foreign Affairs, “The Devolution of the Seas: The Consequences of Oceanic Destruction,” <http://www.foreignaffairs.com/articles/140164/alan-b-sielen/the-devolution-of-the-seas>, JMP)

Of all the threats looming over the planet today, one of the most alarming is the seemingly inexorable descent of the world’s oceans into ecological perdition. Over the last several decades, human activities have so altered the basic chemistry of the seas that they are now experiencing evolution in reverse: a return to the barren primeval waters of hundreds of millions of years ago.

A visitor to the oceans at the dawn of time would have found an underwater world that was mostly lifeless. Eventually, around 3.5 billion years ago, basic organisms began to emerge from the primordial ooze. This microbial soup of algae and bacteria needed little oxygen to survive. Worms, jellyfish, and toxic fireweed ruled the deep. In time, these simple organisms began to evolve into higher life forms, resulting in the wondrously rich diversity of fish, corals, whales, and other sea life one associates with the oceans today.

Yet that sea life is now in peril. Over the last 50 years -- a mere blink in geologic time -- humanity has come perilously close to reversing the almost miraculous biological abundance of the deep. Pollution, overfishing, the destruction of habitats, and climate change are emptying the oceans and enabling the lowest forms of life to regain their dominance. The oceanographer Jeremy Jackson calls it “the rise of slime”: the transformation of once complex oceanic ecosystems featuring intricate food webs with large animals into simplistic systems dominated by microbes, jellyfish, and disease. In effect, humans are eliminating the lions and tigers of the seas to make room for the cockroaches and rats.

The prospect of vanishing whales, polar bears, bluefin tuna, sea turtles, and wild coasts should be worrying enough on its own. But the disruption of entire ecosystems threatens our very survival, since it is the healthy functioning of these diverse systems that sustains life on earth. Destruction on this level will cost humans dearly in terms of food, jobs, health, and quality of life. It also violates the unspoken promise passed from one generation to the next of a better future.

#### Protecting ocean ecosystems is key to save all life on earth

Sielen, 8 --- career senior executive at the EPA (Winter 2008, Alan B., The Fletcher Forum of World Affairs, “An Oceans Manifesto: The Present Global Crisis,” <http://cmbc.ucsd.edu/People/Faculty_and_Researchers/sielen/Sielen.pdf>, JMP)

A generation ago, French explorer and oceanographer Jacques Cousteau warned that the oceans were sick and getting worse every year. Embraced by the public for bringing people on every continent closer to the wonders of nature and for his unvarnished assessment of the state of the oceans, Cousteau was ridiculed by many government officials and scientists as an environmental alarmist. Fortunately, the oceans are not dead; in fact, some areas are teeming with life. Cousteau’s concerns, however, were prophetic: serious degradation of coastal and marine ecosystems worldwide continues, driven by global climate change, pollution, overfishing, and the destruction of coastal habitats. Once thought to possess an endless abundance of resources and an unlimited capacity to safely assimilate wastes, the oceans are now forcing us to reconsider many of our previous assumptions.

The oceans are indispensable in sustaining life on earth. They possess a rich diversity of marine life and support systems that affect the entire planet, such as climate, weather, fisheries, and biological productivity. The importance of the oceans cannot be separated from the larger global environment that encompasses the air, land, and freshwater. Nor will solutions to the problems facing them be distinct from broader questions concerning human development and the quality of life on earth.

Around the world, the daily existence of growing numbers of people is directly affected by the use and management of the oceans and their resources. The fishing industry is a source of protein for a large part of the world’s population and a livelihood, directly and indirectly, for hundreds of millions of people. Travel, tourism, and recreation in coastal areas have an even greater effect on national and global economies. Offshore areas account for as much as one third of the world’s energy supplies. Maritime transportation and port operations are of paramount importance for world trade. The many ways that the oceans can refresh and enrich the human spirit are as legendary as their awesome terrors, such as the devastating Indian Ocean earthquake and tsunami of December 26, 2004.

### Oceans Key to Economy

#### Sustainable marine environment is key to global economy

Sielen, 8 --- career senior executive at the EPA (Winter 2008, Alan B., The Fletcher Forum of World Affairs, “An Oceans Manifesto: The Present Global Crisis,” <http://cmbc.ucsd.edu/People/Faculty_and_Researchers/sielen/Sielen.pdf>, JMP)

As nations and citizens consider their interests in the oceans, it is important to cultivate a better understanding of the large-scale economic effects of coastal and marine ecosystems on regional, national, and local economies. The economic stakes in the oceans are especially high in much of the developing world, where fish and other marine resources play a large part in meeting basic human needs, including food and income. On a global scale, the world’s terrestrial and marine ecosystems provide at least $33 trillion annually in services. The benefits from ecosystems include food, water, timber, livelihoods, recreation, and cultural values, among many others—almost two thirds of which is contributed by marine systems. 7 The idea that a healthy and sustainable marine environment is an essential ingredient in the large economic engine of the world must be better understood and conveyed.

#### Oceans key to economy --- more important than the farm sector

Adams, 14 --- Oceans Advocate at National Resource Defense Council

(3/25/2014, Alexandra, “A Blue Budget Beyond Sequester: Taking care of our oceans,” <http://switchboard.nrdc.org/blogs/aadams/a_blue_budget_beyond_sequester.html>, JMP)

This past year was a tough year - from deep sequester cuts to a government shutdown. Our oceans definitely felt the budget crunch. After much excruciating negotiation, Congress finally passed a budget and now we are on the road to what we hope will be a saner way to govern and plan.

The President has just released his budget for Fiscal Year 2015. The National Oceanic and Atmospheric Administration (NOAA) budget can mean the difference between thriving oceans and coastal communities, or the decline in this invaluable public resource. This year’s budget signals that we will invest in protecting that resource, but by no means provides all that will be needed for the big job ahead. With half of Americans living in coastal areas, NOAA’s work means protecting our citizens and our natural resources. Moreover, with a national ocean economy that is larger than the entire U.S. farm sector in terms of jobs and economic output, keeping this economic powerhouse functioning matters to us all.

### Solving Overfishing Boosts Economy

#### Overfishing undermines the economy --- it’s the biggest threat to the Ocean

Strauss, 14 --- research coordinator at the Environmental Defense Fund (4/2/2014, Kent, “Report: Overfishing bad for fish, but worse for the economy,” <http://www.edf.org/blog/2014/04/02/report-overfishing-bad-fish-worse-economy>)

It’s undeniable that oceans are important to people and the environment. Covering nearly three-quarters of our planet, oceans produce the air we breathe, house the fish we eat and provide us with many of the products we use on a daily basis. And importantly, the oceans play a huge role in creating employment opportunities and sustaining coastal economies.

According to a new report from the National Ocean Economics Program for the Center for the Blue Economy, the oceans economy comprised more than 2.7 million jobs and contributed more than $258 billion to the GDP of the United States in 2010. If you aren’t impressed with those numbers, let’s think in different terms. If the ocean economy were a part of the United States of America, it would be the 25th largest state by employment and the 20th largest state by GDP—about the same size as Colorado.

The oceans economy supports employment almost two and a half times larger than other natural resources industries like farming, mining, and forest harvesting. Approximately 5.4 million jobs in 2010 were directly and indirectly supported by the ocean with their total contribution estimated at $633 billion which is 4.4% of the United States’ GDP.

Increasingly, with disasters like the Deepwater Horizon oil spill and several tsunamis across Asia, the United States and countries across the world are beginning to place more emphasis on just how significant oceans’ health is to the economy. And with more than a billion jobs around the world supported by oceans economies, it’s no surprise that the momentum around maintaining a healthy ocean is building speed. Much of that focus has been on ways to solve overfishing—the most urgent threat to the health of the oceans and the single biggest cause of depleted fisheries worldwide.

Last month, I had the opportunity to meet with scientists, NGO representatives and government officials from around the world, to discuss solutions to overfishing, with particular emphasis on empowering and supporting small-scale fishermen in developing countries. During these meetings, I shared the resources my team at EDF has developed to help fishermen design sustainable fishery management programs and I talked about our Fish Forever initiative, EDF’s partnership with Rare and the Sustainable Fisheries Group at the University of California at Santa Barbara to restore small-scale coastal fisheries.

Perhaps the best part of the trip was just having the opportunity to sit down with like-minded individuals to “geek out” about the ways to effectively manage small-scale fisheries, keep our oceans resilient and protect those who rely on them.

Healthy and abundant oceans create stronger coastal economies. As momentum grows to bring the oceans health in line with sustainability principles, we must continue to be vigilant about the numerous demands and pressures placed upon the oceans' natural resources.

#### Rebuilding fisheries will boost the U.S. economy

Conathan & Kroh, 12 --- Director of Ocean Policy and Associate Director for Ocean Communications at the Center for American Progress (6/27/2012, Michael Conathan and Kiley Kroh, “The Foundations of a Blue Economy; CAP Launches New Project Promoting Sustainable Ocean Industries,” <http://americanprogress.org/issues/green/report/2012/06/27/11794/the-foundations-of-a-blue-economy/>, JMP)

Sustainable commercial and recreational fisheries

Fishing is perhaps the first vocation that comes to mind when considering ocean and coastal economic activity. Fish brought the earliest European settlers to the Americas—before gold or trade routes or colonization became the targets of future exploration.

Today, most Americans still connect to the ocean through fish, whether they are among the nation’s 12 million recreational anglers or simply enjoy an occasional Filet-O-Fish sandwich.

We also have better data for the fishing industry than many other ocean industries. According to the National Oceanic and Atmospheric Administration, or NOAA, which manages our nation’s commercial and recreational fisheries in the oceans and Great Lakes, “fish processing, restaurants, grocery stores, sales of tackle and gas, icehouses, and a multitude of other businesses are involved with the seafood and fishing supply chain, generating $183 billion per year to the U.S. economy and more than 1.5 million full- and part-time jobs.”

While much of today’s fishing news is doom and gloom—preponderance of overfishing, reports that oceans will be nothing but jellyfish by midcentury, and scary predictions of species collapse for everything from the majestic bluefin tuna to the lowly menhaden—there is actually ample reason for optimism. Sustainability is taking hold with consumers, regulators, and industry members alike.

We have ended deliberate overfishing in the United States, and the NOAA’s most recent “Status of Stocks” report to Congress showed a record number of domestic fish populations rebuilt to sustainable levels. In addition, consumer-driven initiatives have led many major retailers to change their buying habits and exclude unsustainably-caught seafood from their shelves.

Establishing long-term, sustainable fisheries will be tremendously beneficial to both our environment and our economy. In testimony before the Senate Committee on Commerce, Science, and Transportation in 2011, NOAA Administrator Jane Lubchenco estimated that rebuilding all U.S. fish populations to sustainable levels could generate “an additional $31 billion in sales impacts, support an additional 500,000 jobs and increase the revenue fishermen receive at the dock by $2.2 billion … more than a 50 percent increase from the current annual dockside revenues” (emphasis in original).

Meanwhile, U.S. seafood consumption has dipped slightly, down from 16 pounds per person in 2008 to 15.8 pounds in 2009, while global seafood consumption has doubled in the last 40 years. At the same time, the percentage of fish we import has skyrocketed. Today, roughly 85 percent of the fish we eat is caught, grown, or processed in other countries. The U.S. trade deficit in seafood products is a staggering $9 billion, ranking second among natural resources only to crude oil.

This is bad news not just for our economy but for the environment as well. The United States is home to some of the most sustainably managed fisheries on the planet. Each fish we buy from a country with less stringent standards not only takes a bite out of American fishermen’s bottom lines, but also contributes to the decline of global fisheries.

Aquaculture, or fish farming, is increasingly playing a greater role in putting fish on our plates. Fully half the fish imported in 2010 was a farmed product. Given the escalating dietary needs of a booming world population, aquaculture will have to be a part of the future of fish. Yet aquaculture, which can be carried out either in the ocean or at land-based fresh or salt water facilities, comes with its own set of environmental concerns, including high concentrations of waste, the need to catch wild fish to feed farmed fish, and potential for corruption of wild populations’ gene pools. But in this sector, too, the United States has far more stringent environmental and human health regulations than virtually any of our trade partners.

Given the clear differences between domestic and imported seafood in terms of sustainability, product quality, and local sourcing, consumer education and market forces can provide a springboard for increasing the value of U.S.-caught fish. This will return more dollars to our fishermen and allow them to make a living without increasing their harvest and compromising the future availability of a finite yet renewable natural resource.

Rebuilt fisheries will pay dividends for recreational fishermen and local economies as well. Anglers spent $18 billion on equipment and for-hire vessels in 2006 alone, according to the NOAA’s most recent figures. These contributions rippled through coastal economies, ultimately contributing $49 billion and creating nearly 400,000 jobs. Further, these figures don’t account for revenues earned by support industries that provide hotel rooms, meals, travel, and other services of which recreational fishermen avail themselves in their quest to land the big one.

## Solvency

### Plan => Environmentally Sustainable Aquaculture

#### The plan promotes environmentally sustainable offshore aquaculture --- reduces pressure on natural fish stocks and prevents fish imports

Johns, 13 --- J.D. Candidate, USC Law 2013 (March 2013, Kristen L., Southern California Law Review, FARM FISHING HOLES: GAPS IN FEDERAL REGULATION OF OFFSHORE AQUACULTURE,” 86 S. Cal. L. Rev. 681, JMP)

I. INTRODUCTION

Fish might be considered "brain food," n1 but there is nothing smart about the way the United States currently manages its seafood production. Although the U.S. government has long promoted the health benefits of products from the sea - even urging Americans to double their seafood intake n2 - it has fallen far behind in developing a domestic source for this seafood. Currently, the United States relies on an almost primitive method for domestic seafood production: taking animals found naturally in the wild. However, this approach is no longer sustainable: most federally managed capture fisheries are either stable or declining, with forty-eight currently overfished, and forty subject to overfishing in 2010. n3 What seafood the United States does not take from its own fisheries it imports; in [\*683] 2011 the United States imported as much as 91 percent of its seafood supply. n4 Fortunately, there is a way for the United States not only to ease the pressure on traditional fisheries - allowing them to recover - but also to provide a significant domestic source of seafood products: through the development and promotion of its domestic offshore aquaculture industry. However, this industry should not be allowed to expand free from regulation, as offshore aquaculture may have serious consequences for both marine and human environments. This Note recommends that a comprehensive regulatory framework be put in place now, in advance of the offshore industry's development, to ensure not only that the industry grows, but also that it does so in an environmentally conscious and sustainable way.

Aquaculture is the farming of shellfish, finfish, and plants in water. n5 Growing sources for protein, instead of taking them from the wild, is not a novel concept: humans have been raising their own beef, poultry, and pork ever since they switched from a hunter-gatherer lifestyle to an agrarian one. Aquaculture has been around for thousands of years, but it has not until recently received much attention or been actively utilized in many parts of the world. The United States has an even shorter history of aquaculture compared to the global industry, n6 and has only recently recognized aquaculture's economic potential. Despite its slow start, the United States has begun to push toward developing its domestic industry in order to provide jobs and to reduce reliance on foreign seafood imports. n7 Now, aquaculture is the fastest-growing agricultural sector in the nation. n8

[\*684] Traditionally, U.S. aquaculture farms are located inland, typically in ponds or tanks that grow freshwater fish. However, as Americans come to prefer products grown in the sea rather than in freshwater - saltwater shrimp is the number one imported seafood product n9 - marine aquaculture operations are sure to grow. Most marine farms are currently located nearshore or in state-owned coastal waters; however, as competition for space near the coast increases, the industry will inevitably move offshore. n10 Much to the delight of environmentalists and consumers alike, "offshore aquaculture" may also be healthier for both the marine environment and the human community, as effluents and diseases are more easily diluted and dispersed in the open ocean than in nearshore sites, which are usually located in bays or other areas with poor circulation. Offshore aquaculture, thus, has enormous potential in the United States: some proponents even believe we are in the early stages of a "blue revolution" of offshore aquaculture production. n11

At the same time, offshore aquaculture poses a host of environmental risks, most of which are not properly addressed by current regulatory schemes. One of the biggest risks is the impact of intentionally or accidentally released farmed fish on native fish populations and marine ecosystems. Fish escapes can harm native populations by altering the genetic makeup of the wild population - many farmed fish are genetically modified to grow larger and mature faster - or by transferring diseases and pathogens generated in the high-density conditions of most farms. And while offshore aquaculture farms may enjoy the benefit of being located far offshore, making for easier dilution and dispersion of waste discharge, these farms also create substantial amounts of organic pollution in the form of nutrients which, when released in excess, can harm marine ecosystems in areas with weak currents and poor circulation. The use of drugs such as pesticides and antibiotics in offshore fish farms can also endanger the marine environment: once these chemicals are added to marine farms, they [\*685] readily disperse into the marine environment and can impact nontarget species. The increased use of antibiotics in fish farms can threaten the human environment as well: overuse has led to an increased resistance in both fish and human bacteria, reducing the effectiveness of these drugs. Finally, offshore aquaculture farms may harm the marine environment by interfering with wild animals' use of their natural habitat, displacing wild fish populations, blocking passages for migrating species, or attracting marine predators. These environmental risks are significant, yet current federal regulation of offshore aquaculture does not adequately address them - mainly because there is no specific federal regulatory scheme for offshore aquaculture.

I propose that a comprehensive and centralized framework for the offshore aquaculture industry be developed, and the roles of the relevant federal agencies and regulatory bodies be clarified. Without such a framework, U.S. aquaculturists are discouraged from moving their operations offshore due to the lack of any regulatory consistency or predictability, which not only makes it difficult to obtain sufficient investment capital, but also leaves any offshore operation vulnerable to legal challenge. In fact, the very first commercial offshore aquaculture project to be issued a fishing permit to operate in federal waters was challenged in federal court. n12 At the same time, regulations are essential to ensuring that the environmental effects of offshore aquaculture - including biological, organic, and chemical pollution, the impact of escaped farmed fish on native populations and marine ecosystems, and habitat modification - are minimized.

This Note first explains why the offshore aquaculture industry needs to be regulated and why it is imperative that such regulations be put in place now. Specifically, Part II will explain why the ever-increasing demand for seafood will lead to a rise in aquaculture production. As the industry moves offshore into the federal waters of the open ocean (known as the exclusive economic zone, or "EEZ"), explicit regulations are needed to promote the offshore industry's development as well as to address its environmental effects. Part III highlights the deficiencies of the current regulatory system - namely, the problems of administrative overlap and ambiguous statutory bases for each agency's regulatory authority. Finally, Part IV recommends that Congress create, through new legislation, a comprehensive regulatory framework that identifies one federal agency as [\*686] having primary regulatory authority over offshore aquaculture practices. Specifically, the proposed National Sustainable Offshore Act of 2011, which identifies the National Oceanic and Atmospheric Administration ("NOAA") as the lead agency to regulate offshore aquaculture, is the ideal legislation for such a task. Part V concludes.

#### The plan addresses environmental threats from aquaculture and ensures sustainable marine ecosystems

\*\*\*Note --- the plan essentially passes the National Sustainable Offshore Aquaculture Act (explained in 1ac Johns, 13 ev)

Naylor & Leonard, 9 --- \*director of the Program on Food Security and the Environment at Stanford University, AND \*\*director of the Aquaculture Program at the Ocean Conservancy (12/17/2009, Roz Naylor & George Leonard, “Ensuring a Sustainable Future for U.S. Ocean Fish Farming,” <http://www.huffingtonpost.com/roz-naylor-george-leonard/ensuring-a-sustainable-fu_b_396415.html>, JMP)

With all eyes on the climate deliberations in Copenhagen, it is more important than ever to find innovative ways of reducing agriculture's contribution to global climate change. The livestock industry in particular has helped feed the world but at a significant cost to the environment, including generating large emissions of greenhouse gas.

One promising solution is to substitute fish production for meat production. But to do so we must ensure that the "blue revolution" in ocean fish farming does not lead to the same suite of environmental problems that have accompanied the "green revolution" for land-based agriculture. Americans' appetite for fish continues to grow and is increasingly met by a year-round supply of fresh fish imported into our marketplace. Yet few Americans know where their fish comes from or how it was produced. Just as most chickens, pigs and cows are raised in tightly confined, intensive operations, so too are many fish.

Right now in the United States we have an opportunity to help ensure that the emerging marine aquaculture sector meets both human and environmental needs. This week, Rep. Lois Capps (D-Calif.) will introduce in the House of Representatives a bill called the National Sustainable Offshore Aquaculture Act that addresses the potential threats of poorly regulated fish farming in U.S. ocean waters. These threats include spread of disease and parasites from farmed to wild fish; discharge of effluents into surrounding waters; misuse of antibiotics and other pharmaceuticals and chemicals; escape of farmed fish into wild fish habitat; killing of marine mammals and sharks that might prey on ocean farm cages; and reliance on use of wild-caught fish in aquaculture feeds, which could deplete food supplies for other marine life and the aquaculture industry itself over time.

These environmental impacts have been evident in many other countries with intensive marine fish farming. The recent collapse of salmon aquaculture in Chile, where industry expansion was prioritized over environmental protection, is the most glaring example. Salmon, one of Chile's leading exports, has suffered a major blow as a result of poor regulation and environmentally unsound management. Tens of thousands of people are now jobless in southern Chile, where the salmon farming industry once boomed.

There are three critical points to be made about the Capps bill. First, unlike previous attempts to legislate on fish farming at the national level, the bill would ensure that U.S. aquaculture adopts a science-based, precautionary approach that establishes a priority for the protection of wild fish and functional ecosystems. This approach is consistent with President Obama's recent call to develop a comprehensive and integrated plan to manage our ocean's many competing uses to ensure protection of vital ecosystem services in years to come.

Second, the Capps bill would preempt the emergence of ecologically risky, piecemeal regulation of ocean fish farming in different regions of the U.S. Efforts are already afoot in Hawaii, California, the Gulf of Mexico and New England to expand marine aquaculture without consistent standards to govern their environmental or social performance. If these piecemeal regional initiatives move forward, there will be little hope of creating a sustainable national policy for U.S. open-ocean aquaculture.

Finally, the Capps bill as currently written has a solid, long-term vision for the appropriate role of fish farming in sustainable ocean ecosystems and thus should win widespread support among environmental and fishing constituencies. It should also garner support from the more progressive end of the aquaculture industry that aspires to sustainable domestic fish production.

Previous federal bills introduced in 2005 and 2007 were fundamentally flawed -- and thus rightly criticized -- because they put the goal of aquaculture expansion far above that of environmental protection. Now, for the first time, a bill has been introduced that would demonstrably protect our ocean ecosystems, fishing communities and seafood consumers from the risks of poorly regulated open-ocean aquaculture.

Rep. Capps and her colleagues are to be commended. Now is the time for the new leadership in Washington -- at the White House and at the National Oceanic and Atmospheric Administration -- to embrace this more science-based and precautionary approach to ensure a sustainable future for U.S. ocean aquaculture.

#### Comprehensive regulatory framework is critical to aquaculture development in federal waters

Johns, 13 --- J.D. Candidate, USC Law 2013 (March 2013, Kristen L., Southern California Law Review, FARM FISHING HOLES: GAPS IN FEDERAL REGULATION OF OFFSHORE AQUACULTURE,” 86 S. Cal. L. Rev. 681, JMP)

II. WHY REGULATE NOW?

Prompt regulation of offshore aquaculture is needed for several reasons. As demand for seafood continues to increase, it is imperative that aquaculture supplements the U.S. domestic seafood supply. However, traditional U.S. aquaculture farms are no longer adequate: farms located inland or in coastal waters must compete more and more for space not only with commercial fishermen, but also with those wishing to use these waters for recreational purposes. Thus, aquaculture will inevitably move offshore from state-controlled to federally controlled waters. However, without a clear and comprehensive regulatory framework giving aquaculturists the incentives or legal assurances to operate in federal waters, developers are discouraged from taking their operations offshore. At the same time, the lack of any comprehensive regulatory framework has allowed some of the environmental risks of offshore aquaculture to go unchecked. Regulations are needed, then, to ensure not only that the industry is developed, but that it does so in a sustainable and precautionary way.

#### Only an overarching federal policy to guide the development of aquaculture will ensure that the process is environmentally sustainable

Spruill, 11 --- President and CEO of Ocean Conservancy (March 2011, Vikki, “RIGHT FROM THE START: OPEN-OCEAN AQUACULTURE IN THE UNITED STATES,” http://www.aces.edu/dept/fisheries/education/documents/Open\_Ocean\_Aquculture\_Right\_from\_the\_Start\_bytheOceanConservancyorganization.pdf, JMP)

In a world with a rapidly growing population and tragically overfished seas, we have come upon a crossroads. The ocean has reached a breaking point in productivity and in ecosystem health in the wake of our taking so many fish from the sea.

As a solution, some have proposed to greatly expand aquaculture—or “fish farming,” as it is commonly known—to close the gap. Already, half of the world’s seafood is farmed, and that amount is growing rapidly. In nations across the globe, however, the waning number of near-to-shore locations appropriate for fish farming has entrepreneurs looking out to the open ocean for new places to locate their operations. In fact, open-ocean fish farms are already in place in many countries, and in Hawaii.

The United States industry is not yet so entrenched, but it is on the verge of rapid development. At present, however, we have no overarching policy to manage and guide the growth of the industry. The future of ocean fish farming has become the focus of considerable debate. Some entrepreneurs would like to see the industry develop as fast as possible. Others would prefer to see the industry go away entirely.

At Ocean Conservancy, we believe that open-ocean aquaculture may help meet our looming seafood challenges, but we know from experiences around the world that poorly planned, poorly operated aquaculture threatens marine life and wastes natural resources. Ocean Conservancy is not opposed to open-ocean aquaculture, but we believe the risks are too great, and the potential damage too long-lasting, to take chances. The growth of the industry, when it comes to our shores, must to be guided by a rigorous planning and regulatory framework that uses the best available science to protect public resources.

This report looks at the lessons learned from open-ocean aquaculture growth outside the United States. It details the risks and outlines policy recommendations we believe are necessary to ensure that when open-ocean aquaculture takes root in the US it does so with proper management oversight and environmental standards. Right now, the US has a critical window of opportunity to create an intelligent regulatory framework to guide the industry. We can establish a rigorous, precautionary framework that is both scientifically robust and responsive to new information.

Now is our chance to get open-ocean aquaculture right from the start.

### AT: Aquaculture Bad Turns

#### Without action we will consume farmed fish from countries with less stringent regulations

Madin, 11 (9/21/2011, Kate, “Where Will We Get Our Seafood? Unlike the rest of the world, the U.S. has not embraced aquaculture,” <http://www.whoi.edu/oceanus/feature/where-will-we-get-our-seafood>, JMP)

By 2030 or 2040, most seafood bought by Americans will be raised on a farm, not caught by fishermen. And, unless policies governing aquaculture in the United States change, the vast majority of seafood eaten by Americans will be farm-raised in another country, possibly one with less stringent health and environmental regulations.

With wild fisheries in decline, the world has turned to aquaculture to provide protein to feed Earth’s rapidly growing human population. But not the United States. While aquaculture already produces half of the world’s seafood, U.S. aquaculture production has been declining since 2003 and today, the U.S. produces only 10 percent of its seafood by aquaculture, said Hauke Kite-Powell, an aquaculture policy specialist at Woods Hole Oceanographic Institution (WHOI). One consequence of this is that the U.S. imports 80 percent of the seafood it consumes, creating a seafood trade deficit.

#### The plan properly addresses environmental risks

\*\*\*Note --- the plan essentially passes the National Sustainable Offshore Aquaculture Act (explained in 1ac Johns, 13 ev)

Wheeler, 13 --- J.D. Candidate 2013, Golden Gate University School of Law (Spring 2013, Garrett Wheeler, Golden Gate University Environmental Law Journal, “COMMENT: A FEASIBLE ALTERNATIVE: THE LEGAL IMPLICATIONS OF AQUACULTURE IN THE UNITED STATES AND THE PROMISE OF SUSTAINABLE URBAN AQUACULTURE SYSTEMS,” 6 Golden Gate U. Envtl. L.J. 295, JMP)

The lack of a comprehensive regulatory aquaculture policy has given way to efforts like the National Sustainable Offshore Aquaculture Act of 2011, the latest Congressional effort concerning aquaculture regulation, proposed by Representative Lois Capps, D-Santa Barbara. n91 The bill, which failed to pass Congressional approval and was referred to the House Subcommittee on Fisheries, Wildlife, Oceans, and Insular Affairs in July of 2011, would have set an unprecedented regulatory framework for offshore fish farm operations by addressing environmental, social, and economic concerns. n92 Central to the bill was a new permitting process mandating would-be ocean fish farmers to obtain authorization from the Secretary of Commerce after meeting a series of requirements aimed at minimizing potentially adverse impacts on marine ecosystems. n93 The requirements included identifying appropriate locations for farms, complying with site inspections, limiting where certain fish species may be farmed, and preventing escapement, disease, and harmful waste discharge. n94 In addition, the bill attempted to initiate a [\*307] research program designed to solve significant data quandaries and address concerns with the ecological sustainability of further aquaculture development and expansion. n95 Although the bill did not become law, its potential impact on the United States aquaculture industry as a whole was substantial, and it may represent a trend toward more comprehensive regulation. At the moment, however, uncertainty abounds and aquaculture operators are left to sift through a seemingly endless array of federal and state regulatory laws.

#### Establishing requirements will motivate the industry to adopt innovative technology and strategies to protect the environment --- market forces alone will fail

Klinger & Naylor, 12 --- \*Ph.D. student in Stanford's Emmett Interdisciplinary Program in Environmental and Resources, AND \*\*professor of environmental Earth system science at Stanford (Dane & Rosamond, “Searching for Solutions in Aquaculture: Charting a Sustainable Course,” <http://woods.stanford.edu/sites/default/files/files/searching%20for%20solutions%20in%20aquaculture.pdf>, JMP)

POLICY AND INFORMATION APPROACHES

The aquaculture sector has a wide range of innovative technologies and management strategies at its disposal to improve its overall environmental performance as it continues to expand. The question is: Will the industry take advantage of these innovations, particularly if the costs of adopting new approaches are initially high? Price signals often provide inducement for technological change and the adoption of improved management, yet capitalism fails to set a sustainable path when the social costs of aquaculture production— namely ecosystem damages—are not priced in the market. Substantial volatility in global commodity prices since ∼2005 has further obscured market signals to producers. Policy interventions, international standards, labeling, and information strategies can help provide incentives to producers to adopt improved technologies and management practices, but they can also be counterproductive or confusing to producers and consumers (5).

To create the right incentives for widespread adoption of the innovations outlined in this review, governments promoting aquaculture need to establish enforceable standards that set clear limits on ecosystem damage, pollution, and resource use. Standards are required for aquaculture operations and siting, as well as for the flow and cumulative impact of nutrient and chemical effluents, pathogen transmission, fish escapes, and invasive species related to aquaculture activities (122). In addition, the establishment of a monitoring system, liability criteria for violations of standards, and a transparency process for public participation are needed to ensure the desired social outcome (122).

A wide range of scientific guidelines and information approaches has emerged to help policy makers and businesses set environmental standards and identify best practices and technologies for aquaculture development. Examples include the use of life-cycle assessments, the global aquaculture performance index, United Nations Food and Agriculture Organization codes of conduct, and business social performance standards (as reviewed by Reference 5). Numerous certification schemes are also available to producers to capture higher returns; although they provide a valuable service to society, they can be extremely costly to producers because there is little coordination among the various schemes. As a result, firms trying to establish a socially responsible global business must meet the demands and inspections of multiple groups.2 Organic certifications are also used in aquaculture when feed sources can be tracked (e.g., Reference 196) but are of limited value as they focus only on inputs to production and do not necessarily curb harmful outputs such as effluents, escapes, and pathogens.

#### Aquaculture is inevitable and it can be made environmentally safe

Kite-Powell, 11 --- aquaculture policy specialist at Woods Hole Oceanographic Institution (9/21/2011, Hauke, interview by Kate Madin, “Where Will We Get Our Seafood? Unlike the rest of the world, the U.S. has not embraced aquaculture,” http://www.whoi.edu/oceanus/feature/where-will-we-get-our-seafood, JMP)

What do you hope people take away from this colloquium?

Kite-Powell: The main thing is that we can do things to increase seafood production in the U.S. that are ecologically and economically sound, and that seafood and fishing industries and the environmental community can find common ground on this issue. It's not a black-or-white situation where all seafood farming is environmentally harmful. If it's done right, it's a good thing. And whether we like it or not, aquaculture will become more and more important in the future. There's just no getting away from that.

#### Net better for the environment --- we can make it sustainable

Kite-Powell, 11 --- aquaculture policy specialist at Woods Hole Oceanographic Institution (9/21/2011, Hauke, interview by Kate Madin, “Where Will We Get Our Seafood? Unlike the rest of the world, the U.S. has not embraced aquaculture,” http://www.whoi.edu/oceanus/feature/where-will-we-get-our-seafood, JMP)

You suggest it would be better for the environment if the world meets growing protein needs by increasing aquaculture, even if it takes some coastal or land areas.

Kite-Powell: I think that's right. Based on the numbers that were presented at our meeting, it is ecologically more efficient to produce fish in a farm than it is in the wild. It's also less energy-intensive and less carbon-intensive to get protein from fish than beef and other four-legged animals. Fish are equivalent to poultry in those terms.

But it has to be done in a way that doesn't create excessive side effects. And just like in agriculture, we know how to do it right, and we know how to do it wrong, and we can make those decisions.

### AT: Offshore Aquaculture Not Feasible / Too Costly

#### Offshore aquaculture is feasible and will become cost competitive with greater development

Johns, 13 --- J.D. Candidate, USC Law 2013 (March 2013, Kristen L., Southern California Law Review, FARM FISHING HOLES: GAPS IN FEDERAL REGULATION OF OFFSHORE AQUACULTURE,” 86 S. Cal. L. Rev. 681, JMP)

At the same time, the growing marine aquaculture industry will have to compete for high-quality sites in the nearshore and coastal waters typically selected for marine farms. Competition for space and use of these state-owned waters with those wishing to use these areas for recreational activities, wildlife protection, or shipping operations will only intensify, n33 making offshore sites more and more appealing. And, although such offshore operations are often more expensive because they require more durable facilities to withstand storms and surges, new technology and interest in the industry will make this industry increasingly lucrative. Due to improved technology, increasing experience, and economies of scale, costs will shrink and the economic potential for offshore aquaculture will grow. n34

### AT: Antibiotics / Chemicals

#### Alternatives being developed to reduce chemical and antibiotic use

Howell, et. al, 14 --- PhD, Project Director of Report and Research Director for Future of Fish (1/15/2014, Colleen, Future of Fish, “Breakthrough Aquaculture: Uncovering solutions that drive ecologically sound and commercially viable models for farm-raised seafood,” <http://www.futureoffish.org/sites/default/files/docs/resources/Aquaculture_Report_FoF_2014.pdf>, JMP)

Antibiotics and Chemical Inputs The use of antibiotics to treat and prevent disease outbreaks is prevalent in dense, single-species aquaculture operations. Chemicals (some of which are banned) are also applied commonly to prevent the growth of algae, bivalves, and other unwanted pests on nets and cages. These inputs can be toxic to both marine organism and human health alike, affecting the well-being of farm laborers as well as consumers. Mitigation: There is a lot of research into anti-foulants to create ones that are nontoxic, and some companies experimenting with cage materials to reduce need for chemicals. There are also methods for physical cleaning of nets instead of chemicals. With regards to antibiotics, appropriate stocking density and siting can effectively reduce and even eliminate their use.

### AT: Causes Overfishing / Fish Used for Food

#### Feed is not a restriction --- industry is reducing amount of wild fish in fish food

Jolly, 11 (1/31/2011, David, “Fish Farming Overtaking Traditional Fisheries,” <http://www.nytimes.com/2011/02/01/business/global/01fish.html?_r=1&>, JMP)

**\*\*\*Note --- Kevern Cochrane is director of the F.A.O.’s resources use and conservation division**

Mr. Stevens of the Global Aquaculture Alliance said the industry had been steadily reducing the amount of wild fish it needed to produce a constant amount of farmed fish.

“People are learning how to use the fish oil and fish meal more efficiently, by providing different formulations of feed at different stages of the fish’s lifecycle,” he said. “But equally important is the development of soy oil, soy meal and rendered byproducts of other animals that can be added to feed. We don’t think feed will be a restriction on aquaculture in the next 10 years.”

#### There are a variety of alternative food sources [that reduce use of fish]

Klinger & Naylor, 12 --- \*Ph.D. student in Stanford's Emmett Interdisciplinary Program in Environmental and Resources, AND \*\*professor of environmental Earth system science at Stanford (Dane & Rosamond, “Searching for Solutions in Aquaculture: Charting a Sustainable Course,” <http://woods.stanford.edu/sites/default/files/files/searching%20for%20solutions%20in%20aquaculture.pdf>, JMP)

**\*\*\*Note --- SCOs = Single Cell Organisms**

As the aquaculture sector continues to expand in a world in which water, land, and fishery resources are under pressure to meet multiple human demands, choices will have to be made carefully about which fish to raise, on what feeds, and in which ecosystems. There are clear advantages to culturing organisms lower on the food chain in terms of FM and FO requirements, stocking density potential, and effluents. But if consumers continue to demand highquality seafood at high TLs, such as salmon, sea bass, shrimp, and tuna, there are three particularly attractive strategies for feeding these animals. The first is the low-hanging fruit: using aquaculture trimmings or combining plant- or animal-based proteins and lipids with FM and FO at different rates during different periods of the life cycle to minimize FM and FO inputs and maximize health benefits to the fish and (human) consumers. The second strategy is to pursue research on polychaetes as a feed source, with specific attention to fish performance with different feed formulations and worm harvesting and preservation practices. Finally, the fields of SCO production and genetic engineering of plants to produce LC omega-3 fatty acids are quickly advancing and demonstrate great potential for reducing FO demand and thus relieving pressure on wild fisheries.

As competition for resources increases, integration of diverse food production systems will become increasingly attractive to improve the efficiency of resource use. Aquaponic and IMTA operations apply principles of ecological engineering to integrate waste streams from fed aquaculture into other forms of food production (51). As profit margins in aquaculture become smaller, the attractiveness of using wastes as inputs to other profitable systems will grow as long as the food safety issues can be resolved.

#### NOAA resolving food issue

Luening, 13 (1/2/2013, Erich, “Obama's First Term Aquaculture Successes,” <http://marthasvineyard.patch.com/groups/erich-luenings-blog/p/bp--obamas-first-term-aquaculture-successes>, JMP)

**\*\*\*Note --- Dr. Michael Rubino is the Director of Aquaculture at the NOAA**

Rubino also points to the work NOAA has done on alternative feeds as another component of its recent efforts under the new national policy.

“On the research side we have worked on with the Soy industry to develop alternative feeds to fish meal feeds,” he explained. “Putting back together the ‘rubiks cube’ of fish feed when adding or replacing fish meal feed. We have collectively worked with the aquaculture and Soybean industries to do this. We are working with the United States Department of Agriculture on alternative feeds, and issued a report on the alternatives, often involves commingling ingredients.”

#### Alternative food sources are being developed that don’t cause overfishing

Strasser, 14 --- Senior Editor of ThinkProgress (4/21/2014, Annie-Rose, “The New, Innovative And More Efficient Way Of Feeding People,” <http://thinkprogress.org/climate/2014/04/21/3422486/big-ag-takes-to-the-ocean/>, JMP)

A longstanding concern about how to feed fish is also being met with a Big Ag answer. Since fish in nature actually eat smaller fish to get their omega-3 fatty acids and nutrients, and since that depletes already-strained wild resources, fish farming is requiring a new look at how to feed the animals. One alternative is using seaweed feeds, since they contain many of the elements that fish require. Another is using old carcasses from fish that have already gone through production. A third and newer innovation is soy-based feeds, similar to what’s currently used to feed land farm animals.

#### Feed manufacturers working to develop diets low in fishmeal and fish oil

Howell, et. al, 14 --- PhD, Project Director of Report and Research Director for Future of Fish (1/15/2014, Colleen, Future of Fish, “Breakthrough Aquaculture: Uncovering solutions that drive ecologically sound and commercially viable models for farm-raised seafood,” <http://www.futureoffish.org/sites/default/files/docs/resources/Aquaculture_Report_FoF_2014.pdf>, JMP)

Feed Feed is viewed as both a major impact of aquaculture and a major constraint to aquaculture development. Many farmed species—regardless of whether they are naturally carnivorous—are fed fishmeal or fish oil derived from wild fish. The capture of forage fish (e.g., anchovies, menhaden, herring) for those purposes contributes to overfishing and the depletion of wild fish stocks. Conventional fish feed can also contain these unsustainable and/or unsavory ingredients: GMO soy and corn, poultry byproducts, feather meal, meat meal, and blood flour. Mitigation: Large feed manufacturers have for years been investing in developing and testing diets low in fishmeal and fish oil, with specific attention to how those diets impact fish growth rates and health qualities, especially omega-3 content. Sourcing fishmeal and fish oil from the trimmings of seafood processed for human consumption is one method of reducing dependence on wild forage fish. Alternative feed sources include algae, yeast, insect meal, and fish processing byproducts. It is important to note that approximately one-third of aquaculture production is of un-fed species. Filter-feeding bivalves and seaweeds require no feed inputs, nor do some species of carp or shrimp if produced in low-intensity systems.

#### Transition to expanded nonfish feeds now

Klinger & Naylor, 12 --- \*Ph.D. student in Stanford's Emmett Interdisciplinary Program in Environmental and Resources, AND \*\*professor of environmental Earth system science at Stanford (Dane & Rosamond, “Searching for Solutions in Aquaculture: Charting a Sustainable Course,” <http://woods.stanford.edu/sites/default/files/files/searching%20for%20solutions%20in%20aquaculture.pdf>, JMP)

**\*\*\*Note --- FM = Fish Meal / FO = Fish Oil**

Commercial Replacement of Fish Meal and Fish Oil

Three main categories of FM and FO replacements are available at commercial scales or are under commercial development: terrestrial crop products, rendered terrestrial animal products, and seafood and aquaculture processing wastes. Several recent reviews assess these alternative feeds in terms of their economic, ecological, and nutritional impacts (for example, References 139, 141, 143, and 153–156).To be a viable alternative for FM and FO, a candidate ingredient must possess certain characteristics, including nutritional suitability; ready availability; competitive pricing; and ease of handling, shipping, storage, and use in feed production. The nutritional quality of alternative feeds is important because it influences feed efficiency, fish growth, stress tolerance, and disease resistance—and hence the use of antibiotics in culture systems. Essential fatty acids in aquafeeds (in particular the LC omega- 3 fatty acids) are a critical element for fish and human health and have been reviewed at length (154, 156, 157). Proteins and lipids in feeds are typically selected on the basis of fish health and performance, consumer acceptance, minimal pollution, ecosystem stress, and human health benefits. Economics also plays an important role, and prices for fish and nonfish feed have recently exhibited substantial volatility. Given limited supply and increasing demand, FM and FO prices are likely to rise in the long-term—a trend that is already facilitating the substitution of nonfish alternatives (139, 143).

### AT: McCutheon

#### McCutcheon agrees fish farming is best solution despite risks --- needs to be more environmentally friendly

McCutcheon, 14 (3/27/2014, Jody, “Something Fishy? Aquaculture and the Environment,” <http://eluxemagazine.com/magazine/theres-something-fishy-aquaculture/>, JMP)

The Solution May Be Simple

Despite risks of food poisoning, ingesting pesticide, and even worse, highly toxic mercury, demand for big commercial fish like swordfish and tuna doesn’t seem to be decreasing, but people would be better off—economically and environmentally—by eating fish lower in the food chain, i.e., those with a more efficient FCR, which include:

Trout (freshwater)

Haddock

Whitefish

Anchovies

Perch

Squid

Mullet

Scallops

Sardines

Domestic crabs

Also, some species are better adapted for aquaculture. Farming barramundi, for example, is more efficient than farming salmon or cod, since barramundi requires less protein in feed than what it ultimately yields, thus producing a net protein gain.

With the huge demand for seafood and the need to preserve wild fisheries, fish farming seems to be the best solution. The billion-dollar question, then, is how to make aquaculture more efficient and healthy and less polluting.

The ideal plan is for fish farms to mimic oceans by mixing multiple, complementary species, including “cleaner fish” to control pests. Some Norwegian farms are already doing this, and they’re producing more biomass and less waste.

Ultimately, the industry must establish proper communication with regards to where the seafood was farmed, and certification of whether it was farmed sustainably. Until then, more often than not, be prepared for a seafood surprise.

### AT: People Won’t Eat Farmed Fish

#### Actually tastes better --- gourmet chefs conclude

Strasser, 14 --- Senior Editor of ThinkProgress (4/21/2014, Annie-Rose, “The New, Innovative And More Efficient Way Of Feeding People,” <http://thinkprogress.org/climate/2014/04/21/3422486/big-ag-takes-to-the-ocean/>, JMP)  
**\*\*\*Note --- Don Kent is President of the Hubbs-Sea World Research Institute**

And what about taste? After all, is it worth giving up parcels of our oceans and creating a whole new industry in the United States just to have some mealy, flavorless fish as a new form of protein? Kent says that’s not the only option.

“I’ve tried our fish with gourmet chefs. We grew striped bass, grown in tanks, grown with pelleted diets,” he recounted. “We gave 20 striped bass, all harvested on sequential days (so we had 20 day-old striped bass, and one day old striped bass harvested), and we had the chef from the Hyatt Regency hotel come in and do a comparison. He said, ‘Well I can really tell the difference between the 20-day-old, and the one-day-old, but I gotta tell you the 20-day-old is better than any product I could source from any provider I have right now.’”

“He wanted to turn it into a signature dish at all Hyatt Regencies in the world. “

#### People like eating farmed fish

Kite-Powell, 11 --- aquaculture policy specialist at Woods Hole Oceanographic Institution (9/21/2011, Hauke, interview by Kate Madin, “Where Will We Get Our Seafood? Unlike the rest of the world, the U.S. has not embraced aquaculture,” http://www.whoi.edu/oceanus/feature/where-will-we-get-our-seafood, JMP)

Some people think there's a taste difference between farmed and wild seafood, for instance, salmon.

Kite-Powell: Yes, I think that's true, in the same way a Butterball turkey tastes different from a wild turkey. The food constituents that go into them are different. Wild salmon eat a lot of little crustaceans, and that's not in the feed given to farm-bred salmon. But lots of people like eating farmed salmon (and turkeys). And there will be continuing innovation in feed, in order to produce a product that people like. The real technological key will be finding substitute sources for the food for finfish—other than fish meal and fish oil, which are now made from wild fish like anchovetta.

## Answers to Offcase Arguments

### AT: T “Its”

#### We Meet --- The aff is the only way the USFG can develop aquaculture –literature describes our aff in the context of development

Buck ’12 (Lisa E., “U.S. Development of Offshore Aquaculture: Regulatory, Economic, and Political Factors,” A thesis In partial fulfillment of the Requirements for the degree of Master of Marine Affairs University of Washington, 2012)

Development of offshore aquaculture in the United States is predominantly influenced by regulatory, economic, and political factors. While some aspects of each category favor development of the industry, for example, rising demand and prices for seafood in the U.S., the dominant thrust of each category to date has been to impede more than favor development. The most commonly cited barrier to development of the industry by the people I interviewed is the lack of a clear, comprehensive federal regulatory framework, and the lack of a lead federal agency with adequate resources to guide and regulate offshore aquaculture. In lieu of a federal regulatory framework, there is a piecemeal system of applicable laws and regulations. However none of these was designed with offshore aquaculture in mind. With the enactment of the NAA in 1980 the Department of Agriculture was designated as the lead federal agency for promotion of aquaculture, and the Joint Subcommittee on Aquaculture was established within the Congress to effectively coordinate aquaculture research and assistance (NAA, 1980). While the NAA granted the authority to coordinate aquaculture research and assistance efforts, it did not create a specific mandate for aquaculture development in the offshore. The NAA mandated that a National Aquaculture Development Plan be created to outline development of the aquaculture industry in the United States, however at the time of enactment of the NAA in 1980, aquaculture activities consisted of mainly freshwater and coastal activities. Offshore aquaculture was not on the horizon. The DOA has promoted traditional types of aquaculture in the United States, however it has not been effective in the promotion of expansion of aquaculture in the United States into federal waters due to its lack of expertise and perhaps interest in the management of marine resources. As a result, no guidance documents have been created which would assist a prospective developer in navigating through the piecemeal framework of regulations that currently exists. Moreover, most of the regulatory, economic and political challenges to the development of offshore aquaculture have been left unaddressed by federal authorities. It is for this reason that the majority of stakeholders believe that NOAA should be the lead federal agency responsible for development and regulation of offshore aquaculture in the United States. NMFS has extensive experience regulating marine fisheries in the United States EEZ. However attempts by the agency to develop a federal framework for offshore aquaculture have been met with resistance from opponents of the industry. Finally, Congress has not come to agreement on what types of guidance should be offered in a federal regulatory framework for offshore aquaculture.

#### 'Development' means "bringing about" or "advancement in." The resolution doesn't say "economic development," just development.

#### ‘Its’ means “associated with in some way” or “relating to.” It doesn’t mandate procession or direct ownership.

#### Our interpretation is sufficient

#### a. Appropriate Limits – Any definition of "development" and "its" that requires the USFG to be engaged in commercial activities over-limits because there are few if any mechanisms that allow the US to be a business. The USFG's primary role is to create policies. The only way they can participate in development is through policy and/or regulatory change.

[The neg's interp would also erase incentives (like PTCs, grants, etc.) and might even prohibit demonstration projects (as those would be developments of a technology, not directly of the ocean). So even increasing "its" investment wouldn't meet. This dooms most aff lit.]

#### b. Contextual – ‘USFG’ & ‘Developers’ are distinct. When policy groups get together to talk about how to develop the ocean, the government provides regulatory certainty while business do the actual developing.

Conservation Law Foundation ’14 (Emily Dahl, Northeast Regional Planning Body Meeting to Develop Ocean Plan for New England Wednesday and Thursday, January 22 & 23, http://www.clf.org/newsroom/northeast-regional-planning-body-meeting-develop-ocean-plan-new-england-wednesday-thursday-january-22-23/)

Representatives from New England states, federal government, tribal nations, the fishing industry, recreational boaters, offshore renewable energy developers, conservationists and others will convene for a two-day meeting to continue development of the Northeast Regional Ocean Plan. Among the important topics that will help to decide the future management of New England’s ocean and coasts are the Plan Framework and Workplan goals, objectives, and actions. Topics will include measures needed to ensure healthy coastal and ocean ecosystems, improved decision making about ocean uses, stakeholder engagement around ocean planning and an in-depth discussion of elements of the two year Draft Workplan designed to produce an ocean plan for New England’s ocean waters.

#### c. Predictable – Current US Ocean Policy and Plans only talk about its development in context of planning and regulatory certainty.

National Ocean Council ’13 (“NATIONAL OCEAN POLICY IMPLEMENTATION PLAN,” APRIL 2013, pg. 7 & 21, <http://www.whitehouse.gov/files/documents/OPTF_FinalRecs.pdf>)

The following actions by Federal agencies will help maintain existing jobs and promote job growth in coastal and marine-related sectors by improving regulatory efficiency, reversing environmental impacts that hinder economic opportunity, and providing information that supports actions to maximize the economic value of our natural resources. The goal of these actions is to enhance both immediate and long-term potentials for job creation. • Increase efficiencies in decision-making by improving permitting processes and coordi- nating agency participation in planning and approval processes. A key goal of the Policy is to improve efficiency across Federal agencies, including permitting, planning, and approval processes to save time and money for ocean-based industries and decision makers at all levels of government while protecting health, safety, and the environment. Interagency work already in progress includes more efficient permitting of shellfish aquaculture activities, which will help produce additional domestic seafood and jobs and provide a template for similar action to support other marine commercial sectors. Through pilot projects developed in collaboration with relevant stakeholders, Federal agencies will identify opportunities to streamline processes and reduce duplicative efforts while ensuring appropriate environmental and other required safeguards.

National Ocean Council ’13 (“NATIONAL OCEAN POLICY IMPLEMENTATION PLAN,” APRIL 2013, pg. 7 & 21, <http://www.whitehouse.gov/files/documents/OPTF_FinalRecs.pdf>)

Supporting Regional Priorities Marine planning is a science-based tool that regions can use to address specific ocean management challenges and advance their economic development and conservation objectives. Marine planning will support regional actions and decision-making and address regionally determined priorities, based on the needs, interests, and capacity of a given region. Just as Federal agencies work with States, tribes, local governments, and users of forests and grasslands, among other areas, marine planning will provide a more coordinated and responsive Federal presence and the opportunity for all coastal and ocean interests in a region to share information and coordinate activities. This will promote more efficient and effective decision-making and enhance regional economic, environmental, social, and cultural well- being. In turn, regional actions will support national objectives to grow the ocean economy, increase regulatory efficiency and consistency, and reduce adverse impacts to environmentally sensitive areas.

### AT: CP Land-Based Aquaculture

#### Offshore aquaculture is comparatively best

Strasser, 14 --- Senior Editor of ThinkProgress (4/21/2014, Annie-Rose, “The New, Innovative And More Efficient Way Of Feeding People,” <http://thinkprogress.org/climate/2014/04/21/3422486/big-ag-takes-to-the-ocean/>, JMP)

**\*\*\*Note --- Sebastian Belle is the Executive Director of the Maine Aquaculture Association**

Permitting challenges is just one of the reasons Belle would like to take more aquaculture offshore. Going further out, he explained, also helps to stabilize temperatures. And experts say that the open ocean can have other environmental benefits, too; one of the big criticisms of the industry is that plopping a bunch of fish out in the ocean means increasing the amount of waste being put into the seas. Open ocean environments can help deal with this concern by creating free-flowing water to distribute that waste evenly.

“If I go five miles out to sea, I’m in 300 feet of water that has a quarter to a half-knot current that’s consistently moving clean water across it,” explains Hubbs-Sea World’s Don Kent. “So, the water itself doesn’t accumulate the materials that the fish are producing — the metabolites, the nitrogen, the phosphorous, that they’re putting out. And it disperses the carbon waste that they’ve got coming out of them in such a manner that it feeds bottom fauna on the bottom, but it doesn’t accumulate so densely that it overpowers them. This has all been demonstrated in models, computer simulations that allow us to say, ‘if I want to grow this many fish in this location with this current, what impact do we think we can predict on the bottom?’”

#### Expanding aquaculture in the EEZ key to reverse the seafood trade deficit

Naylor, 6 --- Fellow at the Center for Environmental Science and Policy, Stanford University (Spring 2006, Rosamond L., “Environmental Safeguards for Open-Ocean Aquaculture,” <http://issues.org/22-3/naylor/>, JMP)

The U.S. Department of Commerce has articulated the need to reverse the seafood deficit, and under the leadership of its subagency, the National Oceanic and Atmospheric Administration (NOAA), has a stated goal of increasing the value of the U.S. aquaculture industry from about $1 billion per year currently to $5 billion by 2025. In order to achieve this goal, the Department of Commerce has set its sights on the federal waters of the Exclusive Economic Zone (EEZ), located between the 3-mile state zone and 200 miles offshore, where the potential for aquaculture development appears almost limitless. The United States has the largest EEZ in the world, amounting to 4.5 million square miles, or roughly 1.5 times the landmass of the lower 48 states. Opening federal waters to aquaculture development could result in substantial commercial benefits, but it also poses significant ecological

risks to the ocean—a place many U.S. citizens consider to be the nation’s last frontier.

#### \*\*\*Note --- next card is also in AT: Aquaculture Bad Turns

#### Their author admits the plan would properly address environmental risks

\*\*\*Note --- the plan essentially passes the National Sustainable Offshore Aquaculture Act (explained in 1ac Johns, 13 ev)

Wheeler, 13 --- J.D. Candidate 2013, Golden Gate University School of Law (Spring 2013, Garrett Wheeler, Golden Gate University Environmental Law Journal, “COMMENT: A FEASIBLE ALTERNATIVE: THE LEGAL IMPLICATIONS OF AQUACULTURE IN THE UNITED STATES AND THE PROMISE OF SUSTAINABLE URBAN AQUACULTURE SYSTEMS,” 6 Golden Gate U. Envtl. L.J. 295, JMP)

The lack of a comprehensive regulatory aquaculture policy has given way to efforts like the National Sustainable Offshore Aquaculture Act of 2011, the latest Congressional effort concerning aquaculture regulation, proposed by Representative Lois Capps, D-Santa Barbara. n91 The bill, which failed to pass Congressional approval and was referred to the House Subcommittee on Fisheries, Wildlife, Oceans, and Insular Affairs in July of 2011, would have set an unprecedented regulatory framework for offshore fish farm operations by addressing environmental, social, and economic concerns. n92 Central to the bill was a new permitting process mandating would-be ocean fish farmers to obtain authorization from the Secretary of Commerce after meeting a series of requirements aimed at minimizing potentially adverse impacts on marine ecosystems. n93 The requirements included identifying appropriate locations for farms, complying with site inspections, limiting where certain fish species may be farmed, and preventing escapement, disease, and harmful waste discharge. n94 In addition, the bill attempted to initiate a [\*307] research program designed to solve significant data quandaries and address concerns with the ecological sustainability of further aquaculture development and expansion. n95 Although the bill did not become law, its potential impact on the United States aquaculture industry as a whole was substantial, and it may represent a trend toward more comprehensive regulation. At the moment, however, uncertainty abounds and aquaculture operators are left to sift through a seemingly endless array of federal and state regulatory laws.

#### High-energy inputs for land-based aquaculture offsets any environmental gains

Howell, et. al, 14 --- PhD, Project Director of Report and Research Director for Future of Fish (1/15/2014, Colleen, Future of Fish, “Breakthrough Aquaculture: Uncovering solutions that drive ecologically sound and commercially viable models for farm-raised seafood,” <http://www.futureoffish.org/sites/default/files/docs/resources/Aquaculture_Report_FoF_2014.pdf>, JMP)

Tension 4: In terms of resource consumption, fish are a “better” protein than land animals. / Fish are the hardest species to grow on land.

While discussion in the marine science world focuses on the negative impacts of fish farming, in truth, farmed fish actually have a lighter environmental toll compared with beef, pork, or even chicken. Fish convert energy into edible protein far more efficiently than mammals. But growing fish on land requires extremely high-energy inputs that can offset those gains. Further, land-based fish farming is risky. With other forms of husbandry, animals are relatively resilient to changes in their surrounding environments. Fish, on the other hand, live and die based on the water conditions in their tanks. A slight variation in temperature, pH, dissolved oxygen, or any number of other factors can be catastrophic. Thus, not only does land-based aquaculture require sophisticated technology to provide constant aeration, filtration, and monitoring, but back-up systems must also be in place.

#### Offshore aquaculture reduces pollution risks and fish grow faster and healthier

Klinger & Naylor, 12 --- \*Ph.D. student in Stanford's Emmett Interdisciplinary Program in Environmental and Resources, AND \*\*professor of environmental Earth system science at Stanford (Dane & Rosamond, “Searching for Solutions in Aquaculture: Charting a Sustainable Course,” <http://woods.stanford.edu/sites/default/files/files/searching%20for%20solutions%20in%20aquaculture.pdf>, JMP)

Offshore Aquaculture

On the basis of costs, food safety, and production uncertainties of integrated approaches, an alternative strategy to managing land and water scarcity and waste accumulation is to move aquaculture offshore. There is no broadly accepted definition of offshore aquaculture (119). Proposed definitions are based on various factors, including distance to the coast, remoteness from port, political boundaries, and physical parameters such as depth and wave height (120–122). In this review, we define offshore aquaculture broadly to include all aquaculture operations that are situated in open ocean-like conditions.

Offshore aquaculture operations culture seaweed, shellfish, and finfish (as reviewed in References 7, 121, and 123–125). Structural components of offshore aquaculture operations vary depending on the species being cultured, but all offshore systems rely on water currents to remove waste and provide clean water and environmental conditions suitable for growth. Additionally, offshore systems must be designed to withstand challenging ocean conditions. There is a robust global commercial aquaculture industry in the coastal zone (125), but there are relatively few commercial farms located in offshore conditions (126). Universities also run or have run several offshore operations for research purposes (127).

Even in this experimental stage of development, it is clear that offshore aquaculture systems offer many advantages. Moving aquaculture offshore removes constraints of land and freshwater availability and reduces conflict with other near-coastal uses (e.g., view sheds, navigation, and commercial and recreational fishing). Although most offshore operations require port access and on land space for logistics, these land requirements are minimal relative to those of other forms of aquaculture. Moving marine aquaculture away from coastal ecosystems may also decrease pollution impacts, as flow rates and dispersal are greater and proximity to coastal flora and fauna is reduced (128). Finally, early evidence indicates that fish farmed offshore are healthier and grow faster (120).

### AT: CP RAS (Recirculating Aquaculture Systems)

#### \*\*\*Note --- one or more of these cards should be read in addition to ev in the above block “2ac CP Land-Based Aquaculture”

#### High costs make scale-up of RAS unlikely --- discourages investments

Klinger & Naylor, 12 --- \*Ph.D. student in Stanford's Emmett Interdisciplinary Program in Environmental and Resources, AND \*\*professor of environmental Earth system science at Stanford (Dane & Rosamond, “Searching for Solutions in Aquaculture: Charting a Sustainable Course,” <http://woods.stanford.edu/sites/default/files/files/searching%20for%20solutions%20in%20aquaculture.pdf>, JMP)

**\*\*\*Note --- RAS = Recirculating Aquaculture Systems**

The main constraints on developing a RAS at a commercial scale are its high costs of feed, labor, operations, and energy. The majority of RASs have been developed for small-scale operations [<50 metric tons (mt) of output per year] (59, 60) for both hatchery production (including brood stock, larval, and juvenile rearing) and grow out around the world. Most existing commercial operations produce freshwater and marine species that can be niche marketed at a high-price point, including salmon smolts, ornamental and tropical fish, tilapia, hybrid striped bass, sturgeon, rainbow trout, arctic char, halibut, eel, sea bass, turbot, and African catfish (57). There are few large-scale (>50 mt per year) operations that are able to harness economies of scale in labor, processing, and infrastructure (60, 76). In general, the results have been mixed: Several commercial RAS operations of ∼50 mt per year in the United States failed in the 1980s and 1990s (60), but some more recent operations have been profitable in Australia and the United States (77–79). High start-up costs combined with uncertain profitability have discouraged investments (59, 60). Despite these drawbacks, RASs do offer some promising economic advantages over conventional systems, including higher stocking densities, year-round production, and reduced water costs (78).

#### Major constraints on RAS development --- also risks disease outbreaks and requires large amount of fish meal to feed high-value fish

Klinger & Naylor, 12 --- \*Ph.D. student in Stanford's Emmett Interdisciplinary Program in Environmental and Resources, AND \*\*professor of environmental Earth system science at Stanford (Dane & Rosamond, “Searching for Solutions in Aquaculture: Charting a Sustainable Course,” <http://woods.stanford.edu/sites/default/files/files/searching%20for%20solutions%20in%20aquaculture.pdf>, JMP)

**\*\*\*Note --- RAS = Recirculating Aquaculture Systems**

**\*\*\*Note --- FM = Fish Meal / FO = Fish Oil**

Another major constraint on RAS development is its energy intensity. Because electricity is required to run the recirculating systems, RASs consume much more operational energy than most other types of aquaculture systems (49, 80). Estimates of the total energy consumption of carnivorous-finfish RAS facilities (including feed) range from 16–98 kilowatt hours per kilogram (kWh/kg) of fish produced, compared to 7.4 kWh/kg for net pen and 27.2 kWh/kg for flow-through farming of similar species (80, 81).

Other concerns associated with RAS include contaminant accumulation and fish mortality, as well as feed efficiency. Although two recent studies found that contaminants in RAS systems were either undetectable or below harmful levels (68, 82), water reuse may allow contaminants from feed and system components to accumulate in RASs, raising the risk of disease outbreak and potentially increasing farmed-fish mortality (83). Additionally, although controlled and optimized environments in RASs have been shown to reduce feed conversion ratios, the high cost of building and operating RASs currently favors production of high-value carnivorous fish that require relatively large amounts of FM and FO (59, 60).

### --- XT: No Scale Up

#### RAS not suitable for large-scale commercial aquaculture systems

Klinger & Naylor, 12 --- \*Ph.D. student in Stanford's Emmett Interdisciplinary Program in Environmental and Resources, AND \*\*professor of environmental Earth system science at Stanford (Dane & Rosamond, “Searching for Solutions in Aquaculture: Charting a Sustainable Course,” <http://woods.stanford.edu/sites/default/files/files/searching%20for%20solutions%20in%20aquaculture.pdf>, JMP)

In striving to control all aspects of production, RASs are also able to guarantee reduced environmental impacts. All wastes can be concentrated and treated or used as an input to other production systems (e.g., agricultural fertilizer or methane generation). RASs can be built in biosecure facilities away from water bodies, allowing farms to culture faster-growing fish that are selectively bred or GM without worries of escapes and biological invasion. Although a RAS serves as a favorable technological fix, it rarely works well economically, especially for large-scale commercial systems. The costs of infrastructure, labor, management, and energy can be prohibitively high. As a result, a RAS shows more promise for highly valued species, such a sturgeon, and little promise for catfish or tilapia.

### AT: Politics DA

#### Rebranding aquaculture as environmentally safe will build support from a number of diverse interest groups

Howell, et. al, 14 --- PhD, Project Director of Report and Research Director for Future of Fish (1/15/2014, Colleen, Future of Fish, “Breakthrough Aquaculture: Uncovering solutions that drive ecologically sound and commercially viable models for farm-raised seafood,” <http://www.futureoffish.org/sites/default/files/docs/resources/Aquaculture_Report_FoF_2014.pdf>, JMP)

OPPORTUNITY 3

Beat the bad reputation of farmed fish.

Landscape: The negative impacts of aquaculture tend to be emphasized by environmental advocacy organizations and hence the US media, giving the false impression that farmed fish is always inferior healthwise and more environmentally destructive than other sources of animal protein. Even shrewd consumers concerned with how and where food is produced apply that assumption to all forms of aquaculture without regard to production method. As a result, the high-end consumer base most likely to drive the market for high-quality, low-impact, local, farm-raised fish opposes it on principle. Perpetuating the problem is the fact that, unlike grass-fed beef, organic chicken, or pastured eggs, there is no market differentiation for fish raised using ecologically sound methods. Thus, innovative fish farmers face the uphill battle of building demand for a product that has a relatively high market price and a bad reputation.

The Push: Building positive branding around ecologically sound aquaculture could both free it from the negative stereotype and tap the growing consumer base focused on high-quality, fresh, local, healthy animal protein. By presenting products in terms chefs and foodies get excited about—flavor, texture, versatility, novelty, and reliability—innovative aquaculture could harness the enthusiasm of those most willing to experiment and most eager to be seen as driving trends. Incorporating ecotourism, community enhancement, and art could also reinvent the face of aquaculture. With the right marketing strategy, the array of benefits that ecologically sound aquaculture can offer should appeal to—and garner support from—a number of diverse interest groups.

The Pushback: Aquaculture currently lacks the cohesion, money, and lobbying power enjoyed by other industries. Thus, launching a national campaign to rebrand aquaculture the way the beef, pork, and egg industries have done could be quite challenging. In addition, the NGO community—a natural ally— may be the toughest to get on board, given their history of extreme resistance to traditional aquaculture endeavors.

The Potential: A successful rebranding campaign could grow demand enough to make ecologically sound aquaculture commercially scalable and investible.

#### The plan will have widespread support --- even from environmental and fishing communities

\*\*\*Note --- the plan essentially passes the National Sustainable Offshore Aquaculture Act (explained in 1ac Johns, 13 ev)

Naylor & Leonard, 9 --- \*director of the Program on Food Security and the Environment at Stanford University, AND \*\*director of the Aquaculture Program at the Ocean Conservancy (12/17/2009, Roz Naylor & George Leonard, “Ensuring a Sustainable Future for U.S. Ocean Fish Farming,” <http://www.huffingtonpost.com/roz-naylor-george-leonard/ensuring-a-sustainable-fu_b_396415.html>, JMP)

Right now in the United States we have an opportunity to help ensure that the emerging marine aquaculture sector meets both human and environmental needs. This week, Rep. Lois Capps (D-Calif.) will introduce in the House of Representatives a bill called the National Sustainable Offshore Aquaculture Act that addresses the potential threats of poorly regulated fish farming in U.S. ocean waters. These threats include spread of disease and parasites from farmed to wild fish; discharge of effluents into surrounding waters; misuse of antibiotics and other pharmaceuticals and chemicals; escape of farmed fish into wild fish habitat; killing of marine mammals and sharks that might prey on ocean farm cages; and reliance on use of wild-caught fish in aquaculture feeds, which could deplete food supplies for other marine life and the aquaculture industry itself over time.

These environmental impacts have been evident in many other countries with intensive marine fish farming. The recent collapse of salmon aquaculture in Chile, where industry expansion was prioritized over environmental protection, is the most glaring example. Salmon, one of Chile's leading exports, has suffered a major blow as a result of poor regulation and environmentally unsound management. Tens of thousands of people are now jobless in southern Chile, where the salmon farming industry once boomed.

There are three critical points to be made about the Capps bill. First, unlike previous attempts to legislate on fish farming at the national level, the bill would ensure that U.S. aquaculture adopts a science-based, precautionary approach that establishes a priority for the protection of wild fish and functional ecosystems. This approach is consistent with President Obama's recent call to develop a comprehensive and integrated plan to manage our ocean's many competing uses to ensure protection of vital ecosystem services in years to come.

Second, the Capps bill would preempt the emergence of ecologically risky, piecemeal regulation of ocean fish farming in different regions of the U.S. Efforts are already afoot in Hawaii, California, the Gulf of Mexico and New England to expand marine aquaculture without consistent standards to govern their environmental or social performance. If these piecemeal regional initiatives move forward, there will be little hope of creating a sustainable national policy for U.S. open-ocean aquaculture.

Finally, the Capps bill as currently written has a solid, long-term vision for the appropriate role of fish farming in sustainable ocean ecosystems and thus should win widespread support among environmental and fishing constituencies. It should also garner support from the more progressive end of the aquaculture industry that aspires to sustainable domestic fish production.

#### Obama already prioritizing ocean policies and igniting a congressional backlash

Eilperin, 6/17 (Juliet, 6/17/2014, “Obama will propose expanding Pacific Ocean marine sanctuary,” <http://www.ticotimes.net/2014/06/17/obama-will-propose-expanding-pacific-ocean-marine-sanctuary>, JMP)

WASHINGTON, D.C. – U.S. President Barack Obama on Tuesday will announce his intent to make a broad swath of the central Pacific Ocean off limits to fishing, energy exploration and other activities, according to senior White House officials.

The proposal, slated to go into effect later this year after a comment period, could create the world’s largest marine sanctuary and double the area of ocean globally that is fully protected.

The announcement — details of which were provided to The Washington Post — is part of a broader push on maritime issues by an administration that has generally favored other environmental priorities. The oceans effort, led by Secretary of State John Kerry and White House counselor John Podesta, is likely to spark a new political battle with Republicans over the scope of Obama’s executive powers.

The president will also direct federal agencies to develop a comprehensive program aimed at combating seafood fraud and the global black-market fish trade. In addition, the administration finalized a rule last week allowing the public to nominate new marine sanctuaries off U.S. coasts and in the Great Lakes.

Obama has used his executive authority 11 times to safeguard areas on land, but scientists and activists have been pressing him to do the same for untouched underwater regions. Former president George W. Bush holds the record for creating U.S. marine monuments, declaring four during his second term, including the one that Obama plans to expand.

Under the proposal, the Pacific Remote Islands Marine National Monument would be expanded from almost 87,000 square miles to nearly 782,000 square miles — all of it adjacent to seven islands and atolls controlled by the United States. The designation would include waters up to 200 nautical miles offshore from the territories.

“It’s the closest thing I’ve seen to the pristine ocean,” said Enric Sala, a National Geographic explorer-in-residence who has researched the area’s reefs and atolls since 2005.

Obama has faced criticism from a variety of groups — including cattle ranchers, law enforcement officers and ATV enthusiasts — over his expansion of protections for federal lands. The ocean area under consideration, by contrast, encompasses uninhabited islands in a remote region with sparse economic activity.

Even so, the designation is expected to face objections from the U.S. tuna fleet that operates in the region. Fish caught in the area account for up to 3 percent of the annual U.S. tuna catch in the western and central Pacific, according to the Pew Charitable Trusts. When Bush created the monument in 2009, he exempted sport fishing to address industry opposition.

Podesta said a public comment period over the summer will allow the Commerce and Interior departments to “fully understand the commercial activity out there” and modify the plan if necessary.

Kerry said Monday that the United States and other nations need to take bolder steps to protect marine habitat and combat other threats. “If this group can’t create a serious plan to protect the ocean for future generations, then who can and who will?” he asked during an appearance at a State Department oceans conference.

On Capitol Hill, some Republicans have sought to limit the administration’s ability to influence offshore activities, viewing it as another attempt by the president to test the limits of White House power.

“It’s another example of this imperial presidency,” House Natural Resources Committee Chairman Doc Hastings, R-Wash., said in an interview, noting that Obama established a National Ocean Policy during his first term to coordinate competing interests at sea. “If there are marine sanctuaries that should be put in place, that should go through Congress.”

For the past 5 1/2 years, the administration has focused on the nuts and bolts of marine issues, aiming to end overfishing in federally managed fisheries and establishing a new planning process for maritime activities. This week’s State Department ocean summit launches what officials there call a broader “global campaign” to address the problems of overfishing, pollution and ocean acidification.

“When the president is besieged by the problems as this administration has faced, it’s tough to keep your focus on ocean policy,” said former Defense Secretary Leon Panetta, who co-founded the Joint Ocean Commission Initiative nearly a decade ago while in Congress. “That’s the problem, you just can’t afford to put oceans on the back burner.”

No other country governs more of the sea than the United States, which controls more than 13 percent of the ocean area overseen by nations. And only China consumes more seafood each year.

The potential expansion area would quintuple the number of underwater mountains under protection. It would also end tuna fishing and provide shelter for nearly two dozen species of marine mammals, five types of threatened sea turtles, and a variety of sharks and other predatory fish species.

Other countries are moving ahead with their own marine reserves. The British government is considering creating a sanctuary around the Pitcairn Islands — an area in the Pacific inhabited by descendants of the mutineers from the HMS Bounty and their Tahitian companions — according to people briefed on the decision.

Anote Tong, president of the small Pacific island nation of Kiribati, announced Monday that he will close an area roughly the size of California to commercial fishing by the end of this year. “It’s our contribution to humanity,” Tong said in an interview.

Pew Charitable Trusts Executive Vice President Joshua Reichert said Obama should also consider expanding the borders of the monuments Bush created in the Northwestern Hawaiian Islands and the Marianas Trench. He said the 1906 Antiquities Act, which allows such designations, is “one of the great equalizers in the ongoing struggle to preserve some of the best examples of America’s natural heritage. Without it, many of these places would long ago have succumbed to the pickax, the chain saw, and the dredge, leaving us all poorer as a result.”

Ben Halpern, an environmental science professor at the University of California at Santa Barbara and the lead scientist for the Ocean Health Index, said maritime issues rank low on politicians’ priority lists because people are disconnected from the sea. “Every single person on the planet benefits from the health of the ocean, but most of them don’t realize it,” he said.

The National Oceanic and Atmospheric Administration’s chief, Kathryn Sullivan, said her agency has focused on increasing the ability of coastal communities to cope with climate change and on monitoring how the marine ecosystem is being transformed. “Data are critical to all of it,” she said.

George Cooper, a lobbyist for the recreational fishing industry, said NOAA has made strides but still overstates the economic impact of the commercial fish industry by comparing the combined imported and domestic seafood trade to U.S. sport fishing.

Budget constraints and congressional opposition also remain obstacles for the administration. During a panel last week for Capitol Hill Ocean Week, Rep. Sam Farr, D-Calif., said NOAA might have to consider “changing its name to NAA” because of cuts to its “wet side.”

William Ruckelshaus, a co-chair of the Joint Ocean Commission Initiative, who served as the Environmental Protection Agency administrator under Presidents Richard M. Nixon and Ronald Reagan, said the new flurry of activity on maritime issues could represent an important shift.

“These kinds of issues only get elevated if the president puts it high on his priority list,” he said.

### AT: Fishing Industry DA

#### Sustainable aquaculture boosts employment in seafood industry

Kite-Powell, 11 --- aquaculture policy specialist at Woods Hole Oceanographic Institution (9/21/2011, Hauke, interview by Kate Madin, “Where Will We Get Our Seafood? Unlike the rest of the world, the U.S. has not embraced aquaculture,” http://www.whoi.edu/oceanus/feature/where-will-we-get-our-seafood, JMP)

Do you think the growth of fish aquaculture is bad for the fishing industry or for environmental groups?

Kite-Powell: No, I don't. Wild fisheries are exploited so heavily today that there really isn't room for more production or economic value from “capture fisheries.” So if we want to increase employment in the seafood industry and increase the whole fisheries value chain in the U.S., it will have to come from farmed seafood. Many environmental groups understand the value of seafood in the human diet, and there's a strong argument for farming seafood in a sustainable way.

We had fishermen at our meeting comment on this. They see their future and the future of their colleagues as being a mix of wild-capture fishing, maybe six months out of the year, and fish farming the other six months, probably shifting more to farming over time. Historically, that's how it's gone with land-based food production.

#### Aquaculture will revive dying fishing communities

Frezza, 12 --- fellow at the Competitive Enterprise Institute and a Boston-based venture capitalist (11/26/2012, Bill, “Regulatory Uncertainty Drives Fish Farmer to Foreign Waters,” <http://www.realclearmarkets.com/articles/2012/11/26/regulatory_uncertainty_drives_fish_farmer_to_foreign_waters_100008.html>, JMP)

NOAA made several attempts a decade ago to promote a national aquatic farming initiative that would cut through the red tape and set up a one-stop-shop for deep-water fish farming permits. Bills were introduced in Congress twice but were shot down due to opposition from entrenched fishing interests. While this sort of short-term protectionism is always politically popular, the reality is that domestic fisheries continue to shrink due to catch limitations. A thriving deep water aquaculture industry could provide sustainable jobs for old fishing communities, repurposing much of the fishing fleet and dockside infrastructure to handle the new business.

# Aquaculture Neg

## Case

### 1nc Aquaculture Now

#### Obama already advancing a national policy to expand ocean aquaculture

Luening, 13 (1/2/2013, Erich, “Obama's First Term Aquaculture Successes,” <http://marthasvineyard.patch.com/groups/erich-luenings-blog/p/bp--obamas-first-term-aquaculture-successes>, JMP)

WASHINGTON D.C.--With the Obama Inauguration for a second term in January, a look at the aquaculture policy successes of the first four years of the administration shows significant momentum in establishing new policies for the industry among other positive developments.

Under the first Barack Obama presidency the first National Aquaculture Policy (NAP) was adopted, along with the coordination of aquaculture and other marine stakeholders under the president’s National Ocean Council’s (NOC) Draft Implementation Plan, indicating a serious effort to push the domestic seafood farming sector forward, say aquaculture policy makers and industry members.

Aquaculture professionals say there has been a change in how aquaculture is perceived at least on the policy level over the last four years.

“I can see that starting to happen slowly now,” said Sebastian Belle of Maine Aquaculture Association, at the December Northeastern Aquaculture Conference and Expo.

NAP was the most significant and most headlined aquaculture development under Obama’s first term, Dr. Michael Rubino, the Director of Aquaculture at the National Oceanic and Atmospheric Administration NOAA, told Aquaculture North America but there were other accomplishments made on-the-ground that were important as well.

“There was a fair number of the sort of nots in bolts things that happened too,” he said. “Certainly when Jane Lubchenco was appointed as NOAA director they asked us to look at everything we are doing, stakeholders and all, on aquaculture.”

The NOAA went around the country and got input at several public meetings as well.

“The federal government hadn’t done that in 10 years, and we got a broad economic view. NOAA policy was addressed on the kind of things we do as far as marine stewardship and engagement,” Rubino said. “Going back 40 years, there have been several commissions, all the way up to the establishment of the National Oceans Council in 2004, and others in between. They all have had aquaculture components, all saying the same thing. Aquaculture has to be done sustainably, with trade policy and good science behind it.”

It’s fair to say that the adoption of the NAP came out of all of those commissions over the years enhanced by the efforts under Lubchenco to get NOAA officials out to different regions of the country to add their voices and interests to the dialogue around framing the new policy.

In the summer of 2011, the United States National Aquaculture Policy was announced, making headlines as the first of its kind in a country that has 95,471 statute miles of tidal shoreline and 200 nautical miles from those coasts out to sea as part of the Exclusive Economic Zone, according to NOAA.

The new aquaculture policy and its components, which reflect the public comments received after draft policies were released on February 9, focus on:

encouraging and fostering sustainable aquaculture that increases the value of domestic aquaculture production and creates American business, jobs, and trade opportunities;

making timely management decisions based on the best scientific information available;

advancing sustainable aquaculture science;

ensuring aquaculture decisions protect wild species and healthy coastal and ocean ecosystems;

developing sustainable aquaculture compatible with other uses;

working with partners domestically and internationally; and,

promoting a level playing field for U.S. aquaculture businesses engaged in international trade, working to remove foreign trade barriers, and enforcing our rights under U.S. trade agreements.

#### Regulatory concerns being resolved in a systemic manner

Luening, 13 (1/2/2013, Erich, “Obama's First Term Aquaculture Successes,” <http://marthasvineyard.patch.com/groups/erich-luenings-blog/p/bp--obamas-first-term-aquaculture-successes>, JMP)

**\*\*\*Note --- Dr. Michael Rubino is the Director of Aquaculture at the NOAA**

The third initiative, under the National Ocean Policy, is to improve the regulatory environment for aquaculture without hurting environmental stewardship, he added. “We are starting to do work on that specifically on shellfish, which is way ahead of finfish aquaculture here in the U.S.,” he explained. “Setting out with ‘who does what when,’ with permitting and applying that at the core district areas. We also want to set up one-stop-permit shops. Once we get our work done on shellfish, same people will work on fin fish, using Washington State, Hawaii and Maine as examples.”

### --- XT: SQ Expanding Sustainable Aquaculture

#### Current policy is expanding sustainable aquaculture

ENS, 11 (6/13/2011, Environmental News Service, “Obama Administration Promotes Aquaculture in U.S. Waters,” <http://ens-newswire.com/2011/06/13/obama-administration-promotes-aquaculture-in-u-s-waters/>, JMP)

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promoting a level playing field for U.S. aquaculture businesses engaged in international trade, working to remove foreign trade barriers, and enforcing our rights under U.S. trade agreements

Along with the Obama administration’s new policy, the Commerce Department and NOAA announced additional steps in the future to support the development of the aquaculture industry through:

Developing a National Shellfish Initiative in partnership with the shellfish industry to increase commercial production of shellfish, which would create jobs, provide locally-produced food, restore shellfish populations and habitats, and improve water quality.

Implementing the Gulf of Mexico Fishery Management Plan for Aquaculture, which includes the regulatory infrastructure needed for offshore aquaculture development in the Gulf.

The domestic aquaculture industry – both freshwater and marine – currently supplies about five percent of the seafood consumed in the United States.

The cultivation of shellfish, such as oysters, clams, and mussels, comprises about two-thirds of U.S. marine aquaculture production.

Salmon and shrimp aquaculture contribute about 25 percent and 10 percent, respectively. Current production takes place mainly on land, in ponds, and in states’ coastal waters.

“This new focus on helping us develop and expand sustainable aquaculture is welcomed,” said Bill Dewey, a shellfish biologist and clam farmer of more than 27 years based in Shelton, Washington. “When done right, aquaculture can improve the environment, provide jobs and reclaim American dollars that are being spent on imported aquaculture products.”

#### New policies expanding sustainable aquaculture

NOAA, 11 (6/29/2011, “Commerce and NOAA release national aquaculture policies to increase domestic seafood production, create sustainable jobs, and restore marine habitats,” <http://www.noaanews.noaa.gov/stories2011/20110609_aquaculture.html>, JMP)

The Department of Commerce and NOAA today released national sustainable marine aquaculture policies to meet the growing demand for healthy seafood, to create jobs in coastal communities, and restore vital ecosystems. Foreign aquaculture accounts for about half of the 84 percent of seafood imported by the U.S., contributing to the $9 billion trade deficit in seafood.

“Our current trade deficit in seafood is approximately $9 billion,” Commerce Secretary Gary Locke said. “Encouraging and developing the U.S. aquaculture industry will result in economic growth and create jobs at home, support exports to global markets, and spur new innovations in technology to support the industry.”

“Sustainable domestic aquaculture can help us meet the increasing demand for seafood and create jobs in our coastal communities,” said Jane Lubchenco, Ph.D., under secretary of commerce for oceans and atmosphere and NOAA administrator. “Our vision is that domestic aquaculture will provide an additional source of healthy seafood to complement wild fisheries, while supporting healthy ecosystems and coastal economies.”

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The Commerce and NOAA policies build on priorities of President Obama’s National Ocean Policy, including the emphasis on protecting, maintaining and restoring healthy and diverse ecosystems; supporting sustainable uses of the ocean; and increasing scientific understanding and applying that knowledge to make better decisions.

### 1nc Seafood Imports

#### Seafood trade deficit doesn’t undermine the economy

Kite-Powell, 11 --- aquaculture policy specialist at Woods Hole Oceanographic Institution (9/21/2011, Hauke, interview by Kate Madin, “Where Will We Get Our Seafood? Unlike the rest of the world, the U.S. has not embraced aquaculture,” http://www.whoi.edu/oceanus/feature/where-will-we-get-our-seafood, JMP)

What conclusions did you reach about the U.S. seafood trade deficit?

Kite-Powell: Two key facts were highlighted in the colloquium discussions. First, the U.S. seafood trade deficit is important to the seafood industry, but it's not a big contributor to our national trade picture—it's swamped by our trade in petroleum and manufactured goods. So eliminating the seafood trade deficit is not going to make a noticeable dent in our nation’s overall trade situation.

And second, trade in seafood is not necessarily a bad thing. If there are other countries that can produce high-quality seafood much more efficiently than we can, it makes sense for us to buy it from them. There are species that we may not want to grow in large quantities in the U.S.—possibly shrimp, which comprises a big chunk of our seafood trade deficit. Shrimp are farmed most efficiently in coastal ponds, and we don't have a lot of spare coastal real estate for ponds in the U.S. So it may not make sense to try to become self-sufficient in shrimp.

#### Economic decline doesn’t cause war --- recent statistical evidence proves

Drezner, 12 --- The Fletcher School of Law and Diplomacy at Tufts University (October 2012, Daniel W., “THE IRONY OF GLOBAL ECONOMIC GOVERNANCE: THE SYSTEM WORKED,”

[www.globaleconomicgovernance.org/wp-content/uploads/IR-Colloquium-MT12-Week-5\_The-Irony-of-Global-Economic-Governance.pdf](http://www.globaleconomicgovernance.org/wp-content/uploads/IR-Colloquium-MT12-Week-5_The-Irony-of-Global-Economic-Governance.pdf))

The final outcome addresses a dog that hasn’t barked: the effect of the Great Recession on cross-border conflict and violence. During the initial stages of the crisis, multiple analysts asserted that the financial crisis would lead states to increase their use of force as a tool for staying in power.37 Whether through greater internal repression, diversionary wars, arms races, or a ratcheting up of great power conflict, there were genuine concerns that the global economic downturn would lead to an increase in conflict. Violence in the Middle East, border disputes in the South China Sea, and even the disruptions of the Occupy movement fuel impressions of surge in global public disorder.

The aggregate data suggests otherwise, however. The Institute for Economics and Peace has constructed a “Global Peace Index” annually since 2007. A key conclusion they draw from the 2012 report is that “The average level of peacefulness in 2012 is approximately the same as it was in 2007.”38 Interstate violence in particular has declined since the start of the financial crisis – as have military expenditures in most sampled countries. Other studies confirm that the Great Recession has not triggered any increase in violent conflict; the secular decline in violence that started with the end of the Cold War has not been reversed.39 Rogers Brubaker concludes, “the crisis has not to date generated the surge in protectionist nationalism or ethnic exclusion that might have been expected.”40

None of these data suggest that the global economy is operating swimmingly. Growth remains unbalanced and fragile, and has clearly slowed in 2012. Transnational capital flows remain depressed compared to pre-crisis levels, primarily due to a drying up of cross-border interbank lending in Europe. Currency volatility remains an ongoing concern. Compared to the aftermath of other postwar recessions, growth in output, investment, and employment in the developed world have all lagged behind. But the Great Recession is not like other postwar recessions in either scope or kind; expecting a standard “V”-shaped recovery was unreasonable. One financial analyst characterized the post-2008 global economy as in a state of “contained depression.”41 The key word is “contained,” however. Given the severity, reach and depth of the 2008 financial crisis, the proper comparison is with Great Depression. And by that standard, the outcome variables look impressive. As Carmen Reinhart and Kenneth Rogoff concluded in This Time is Different: “that its macroeconomic outcome has been only the most severe global recession since World War II – and not even worse – must be regarded as fortunate.”42

#### The U.S. and global economy are resilient – new macroeconomic policies absorb shocks

Behravesh, 6 (Nariman, most accurate economist tracked by USA Today and chief global economist and executive vice president for Global Insight, Newsweek, “The Great Shock Absorber; Good macroeconomic policies and improved microeconomic flexibility have strengthened the global economy's 'immune system.'” 10-15-2006, [www.newsweek.com/id/47483](http://www.newsweek.com/id/47483))

The U.S. and global economies were able to withstand three body blows in 2005--one of the worst tsunamis on record (which struck at the very end of 2004), one of the worst hurricanes on record and the highest energy prices after Hurricane Katrina--**without missing a beat.** This resilience was especially remarkable in the case of the United States, which since 2000 has been able to shrug off the biggest stock-market drop since the 1930s, a major terrorist attack, corporate scandals and war.

Does this mean that recessions are a relic of the past? No, but recent events do suggest that the global economy's "immune system" is now strong enough to absorb shocks that 25 years ago would probably have triggered a downturn. In fact, over the past two decades, recessions have not disappeared, but have become considerably milder in many parts of the world. What explains this enhanced recession resistance? The answer: a combination of good macroeconomic policies and improved microeconomic flexibility.

Since the mid-1980s, central banks worldwide have had great success in taming inflation. This has meant that long-term interest rates are at levels not seen in more than 40 years. A low-inflation and low-interest-rate environment is especially conducive to sustained, robust growth. Moreover, central bankers have avoided some of the policy mistakes of the earlier oil shocks (in the mid-1970s and early 1980s), during which they typically did too much too late, and exacerbated the ensuing recessions. Even more important, in recent years the Fed has been particularly adept at crisis management, aggressively cutting interest rates in response to stock-market crashes, terrorist attacks and weakness in the economy.

The benign inflationary picture has also benefited from increasing competitive pressures, both worldwide (thanks to globalization and the rise of Asia as a manufacturing juggernaut) and domestically (thanks to technology and deregulation). Since the late 1970s, the United States, the United Kingdom and a handful of other countries have been especially aggressive in deregulating their financial and industrial sectors. This has greatly increased the flexibility of their economies and reduced their vulnerability to inflationary shocks. Looking ahead, what all this means is that a global or U.S. recession will likely be avoided in 2006, and probably in 2007 as well. Whether the current expansion will be able to break the record set in the 1990s for longevity will depend on the ability of central banks to keep the inflation dragon at bay and to avoid policy mistakes. The prospects look good. Inflation is likely to remain a low-level threat for some time, and Ben Bernanke, the incoming chairman of the Federal Reserve Board, spent much of his academic career studying the past mistakes of the Fed and has vowed not to repeat them.

At the same time, no single shock will likely be big enough to derail the expansion. What if oil prices rise to $80 or $90 a barrel? Most estimates suggest that growth would be cut by about 1 percent--not good, but no recession. What if U.S. house prices fall by 5 percent in 2006 (an extreme assumption, given that house prices haven't fallen nationally in any given year during the past four decades)? Economic growth would slow by about 0.5 percent to 1 percent. What about another terrorist attack? Here the scenarios can be pretty scary, but an attack on the order of 9/11 or the Madrid or London bombings would probably have an even smaller impact on overall GDP growth.

So what would it take to trigger a recession in the U.S. or world economies over the next couple of years? Two or more big shocks occurring more or less simultaneously. Global Insight recently ran a scenario showing that a world recession could happen if the following combination of events were to take place: oil prices above $100 per barrel, inflation and interest rates running 3 percentage points above current levels and a 10 percent drop in home prices across many industrial nations (e.g., the United States, the United Kingdom, Spain, Australia, Sweden). The likely timing of such a recession would be 2007. However, given the extremeness of these assumptions, the probability of such a scenario is less than 20 percent.

The good news is that the chances of a recession occurring in the next couple of years are low. The not-so-good news is that assertions about recessions being relegated to history's trash heap are still premature.

### --- XT: No War

#### Economic crisis won’t cause war

Barnett 9—senior managing director of Enterra Solutions LLC (Thomas, The New Rules: Security Remains Stable Amid Financial Crisis, 25 August 2009, http://www.aprodex.com/the-new-rules--security-remains-stable-amid-financial-crisis-398-bl.aspx, AMiles)

When the global financial crisis struck roughly a year ago, the blogosphere was ablaze with all sorts of scary predictions of, and commentary regarding, ensuing conflict and wars -- a rerun of the Great Depression leading to world war, as it were. Now, as global economic news brightens and recovery -- surprisingly led by China and emerging markets -- is the talk of the day, it's interesting to look back over the past year and realize how globalization's first truly worldwide recession has had virtually no impact whatsoever on the international security landscape. None of the more than three-dozen ongoing conflicts listed by GlobalSecurity.org can be clearly attributed to the global recession. Indeed, the last new entry (civil conflict between Hamas and Fatah in the Palestine) predates the economic crisis by a year, and three quarters of the chronic struggles began in the last century. Ditto for the 15 low-intensity conflicts listed by Wikipedia (where the latest entry is the Mexican "drug war" begun in 2006). Certainly, the Russia-Georgia conflict last August was specifically timed, but by most accounts the opening ceremony of the Beijing Olympics was the most important external trigger (followed by the U.S. presidential campaign) for that sudden spike in an almost two-decade long struggle between Georgia and its two breakaway regions. Looking over the various databases, then, we see a most familiar picture: the usual mix of civil conflicts, insurgencies, and liberation-themed terrorist movements. Besides the recent Russia-Georgia dust-up, the only two potential state-on-state wars (North v. South Korea, Israel v. Iran) are both tied to one side acquiring a nuclear weapon capacity -- a process wholly unrelated to global economic trends. And with the United States effectively tied down by its two ongoing major interventions (Iraq and Afghanistan-bleeding-into-Pakistan), our involvement elsewhere around the planet has been quite modest, both leading up to and following the onset of the economic crisis: e.g., the usual counter-drug efforts in Latin America, the usual military exercises with allies across Asia, mixing it up with pirates off Somalia's coast). Everywhere else we find serious instability we pretty much let it burn, occasionally pressing the Chinese -- unsuccessfully -- to do something. Our new Africa Command, for example, hasn't led us to anything beyond advising and training local forces. So, to sum up: •No significant uptick in mass violence or unrest (remember the smattering of urban riots last year in places like Greece, Moldova and Latvia?); •The usual frequency maintained in civil conflicts (in all the usual places); •Not a single state-on-state war directly caused (and no great-power-on-great-power crises even triggered); •No great improvement or disruption in great-power cooperation regarding the emergence of new nuclear powers (despite all that diplomacy); •A modest scaling back of international policing efforts by the system's acknowledged Leviathan power (inevitable given the strain); and •No serious efforts by any rising great power to challenge that Leviathan or supplant its role. (The worst things we can cite are Moscow's occasional deployments of strategic assets to the Western hemisphere and its weak efforts to outbid the United States on basing rights in Kyrgyzstan; but the best include China and India stepping up their aid and investments in Afghanistan and Iraq.) Sure, we've finally seen global defense spending surpass the previous world record set in the late 1980s, but even that's likely to wane given the stress on public budgets created by all this unprecedented "stimulus" spending. If anything, the friendly cooperation on such stimulus packaging was the most notable great-power dynamic caused by the crisis. Can we say that the world has suffered a distinct shift to political radicalism as a result of the economic crisis? Indeed, no. The world's major economies remain governed by center-left or center-right political factions that remain decidedly friendly to both markets and trade. In the short run, there were attempts across the board to insulate economies from immediate damage (in effect, as much protectionism as allowed under current trade rules), but there was no great slide into "trade wars." Instead, the World Trade Organization is functioning as it was designed to function, and regional efforts toward free-trade agreements have not slowed. Can we say Islamic radicalism was inflamed by the economic crisis? If it was, that shift was clearly overwhelmed by the Islamic world's growing disenchantment with the brutality displayed by violent extremist groups such as al-Qaida. And looking forward, austere economic times are just as likely to breed connecting evangelicalism as disconnecting fundamentalism. At the end of the day, the economic crisis did not prove to be sufficiently frightening to provoke major economies into establishing global regulatory schemes, even as it has sparked a spirited -- and much needed, as I argued last week -- discussion of the continuing viability of the U.S. dollar as the world's primary reserve currency. Naturally, plenty of experts and pundits have attached great significance to this debate, seeing in it the beginning of "economic warfare" and the like between "fading" America and "rising" China. And yet, in a world of globally integrated production chains and interconnected financial markets, such "diverging interests" hardly constitute signposts for wars up ahead. Frankly, I don't welcome a world in which America's fiscal profligacy goes undisciplined, so bring it on -- please! Add it all up and it's fair to say that this global financial crisis has proven the great resilience of America's post-World War II international liberal trade order.

#### Economic decline doesn’t cause war

Ferguson 6 (Niall, Professor of History – Harvard University, Foreign Affairs, 85(5), September / October, Lexis)

Nor can economic crises explain the bloodshed. What may be the most familiar causal chain in modern historiography links the Great Depression to the rise of fascism and the outbreak of World War II. But that simple story leaves too much out. Nazi Germany started the war in Europe only after its economy had recovered. Not all the countries affected by the Great Depression were taken over by fascist regimes, nor did all such regimes start wars of aggression. In fact, **no** general **relationship between economics and conflict is discernible** for the century as a whole. Some wars came after periods of growth, others were the causes rather than the consequences of economic catastrophe, and some **severe economic crises were not followed by wars**.

### 1nc Marine Environment / Overfishing

#### U.S. already has strict aquaculture standards

Conathan & Kroh, 12 --- Director of Ocean Policy and Associate Director for Ocean Communications at the Center for American Progress (6/27/2012, Michael Conathan and Kiley Kroh, “The Foundations of a Blue Economy; CAP Launches New Project Promoting Sustainable Ocean Industries,” <http://americanprogress.org/issues/green/report/2012/06/27/11794/the-foundations-of-a-blue-economy/>, JMP)

Aquaculture, or fish farming, is increasingly playing a greater role in putting fish on our plates. Fully half the fish imported in 2010 was a farmed product. Given the escalating dietary needs of a booming world population, aquaculture will have to be a part of the future of fish. Yet aquaculture, which can be carried out either in the ocean or at land-based fresh or salt water facilities, comes with its own set of environmental concerns, including high concentrations of waste, the need to catch wild fish to feed farmed fish, and potential for corruption of wild populations’ gene pools. But in this sector, too, the United States has far more stringent environmental and human health regulations than virtually any of our trade partners.

#### U.S. fisheries are recovering now

Plumer, 14 (5/8/2014, Brad, “How the US stopped its fisheries from collapsing,” <http://www.vox.com/2014/5/8/5669120/how-the-us-stopped-its-fisheries-from-collapsing>, JMP)

We hear a lot of grim stories about overfishing and the decline of fisheries around the world. Bluefin tuna is vanishing. Chilean sea bass is dwindling. Pretty soon, it sometimes seems like, all that'll be left is the jellyfish.

So it's worth highlighting a country that has actually done a lot to curtail overfishing and rebuild its fisheries in the past decade — the United States.

Back in the 1980s and '90s, many fisheries in the US were in serious trouble. Fish populations were dropping sharply. Some of New England's best-known groundfish stocks — including flounder, cod, and haddock — had collapsed, costing the region's coastal communities hundreds of millions of dollars.

But the picture has improved considerably in the last decade, thanks in part to stricter fishing regulations. Last week, the National Oceanic and Atmospheric Administration (NOAA) released its annual fisheries update for 2013 — and the news was encouraging. Yes, progress has been uneven. About one-fifth of assessed stocks are still overfished. But on the whole, US fisheries are steadily recovering.

#### Fisheries and oceans not headed for collapse

Hilborn, 10 --- Professor, Aquatic and Fishery Sciences, University of Washington (November 2010, Ray, “Apocalypse Forestalled: Why All the World’s Fisheries Aren’t Collapsing,” <http://www.atsea.org/doc/Hilborn%202010%20Science%20Chronicles%202010-11-1.pdf>, JMP)

If you have paid any attention to the conservation literature or science journalism over the last five years, you likely have gotten the impression that our oceans are so poorly managed that they soon will be empty of fish — unless governments order drastic curtailment of current fishing practices, including the establishment of huge no-take zones across great swaths of the oceans.

To be fair, there are some places where such severe declines may be true. A more balanced diagnosis, however, tells a different story — one that still requires changes in some fishing practices, but that is far from alarmist. But this balanced diagnosis is being almost wholly ignored in favor of an apocalyptic rhetoric that obscures the true issues fisheries face as well as the correct cures for those problems.

To get the storyline correct, it is important to go back to the sources of the apocalyptic rhetoric. In 2006, a paper was published by Boris Worm in Science (Worm et al. 2006) that received enormous press coverage. It argued that, if current trends continued, all fish stocks would collapse by 2048. Worm and his coauthors concluded their paper with the following sentence: “Our analyses suggest that business as usual would foreshadow serious threats to global food security, coastal water quality, and ecosystem stability, affecting current and future generations.”

Others joined in, chief among them Daniel Pauly, who rang and continues to ring the apocalyptic note. “There are basically two alternatives for fisheries science and management: one is obviously continuing with business as usual…,” wrote Pauly in 2009 (Pauly 2009a). “This would lead, in addition to further depletion of biodiversity, to intensification of ‘fishing down marine food webs,’ which ultimately involves the transformation of marine ecosystems into dead zones.”

It might surprise you to learn Pauly’s views are not universally held among scientists. Indeed, these papers exposed a deep divide in the marine science community over the state of fish stocks and the success of existing fisheries management approaches. Numerous critiques of the apocalyptic stance were published after the 2006 paper, suggesting that Worm et al. had greatly exaggerated the failings of “business as usual.” For instance, Steve Murawski, director of scientific programs and chief science advisor, defended the U.S. fisheries management system and pointed out that the proportion of stocks overfished in the U.S. was declining, not increasing (Murawski et al. 2007).

No one disagrees on our goals for the world’s fisheries stocks — we need higher fish abundances. The arguments are largely about where we are now and how we will get to higher fish abundance and lower fishing pressure. Are current fisheries management systems working to decimate fish stocks…or rebuild them? Do we need large areas of the oceans closed to fishing to assure sustainable seafood supply? Daniel Pauly says yes to the latter question: “This transformation,” he writes, “would also require extensive use of ocean zoning and spatial closures, including no-take marine protected areas (MPAs). Indeed, MPAs must be at the core of any scheme intending to put fisheries on an ecologically sustainable basis” (Pauly 2009a).

In an attempt to resolve this dispute, Boris Worm and I several years ago organized a set of four meetings, sponsored by the National Center for Ecological Analysis and Synthesis (NCEAS), in which we assembled a database on abundance as measured by fisheries agencies and research surveys. Participants included several of the authors of the 2006 paper as well as several people from national fisheries management agencies.

The results were published in Science in 2009 (Worm et al. 2009), and showed that, while the majority of stocks were still below target levels, fishing pressure had been reduced in most ecosystems (for which we had data) to below the point that would assure long-term maximum sustainable yield of fish from those ecosystems. About 30 percent of the stocks would currently be classified as overfished — but, generally, fishing pressure has been reduced enough that all but 17 percent of stocks would be expected to recover to above overfished thresholds if current fishing pressure continues. In the United States, there was clear evidence for the rebuilding of marine ecosystems and stock biomass. The idea that 70 percent of the world’s fish stocks are overfished or collapsed and that the rate of overfishing is accelerating (Pauly 2007) was shown by Worm et al. (2009) and FAO (2009) to be untrue.

The Science paper coming out of the NCEAS group also showed that the success in reducing fishing pressure had been achieved by a broad range of traditional fisheries management tools — including catchand- effort limitation, gear restrictions and temporary closed areas. Marine protected areas were an insignificant factor in the success achieved.

#### Can’t solve without addressing alt causes

Sielen, 13 --- Senior Fellow for International Environmental Policy at the Center for Marine Biodiversity and Conservation at the Scripps Institution of Oceanography (Nov/Dec 2013, Alan B., Foreign Affairs, “The Devolution of the Seas: The Consequences of Oceanic Destruction,” <http://www.foreignaffairs.com/articles/140164/alan-b-sielen/the-devolution-of-the-seas>, JMP)

A WAY FORWARD

Governments and societies have come to expect much less from the sea. The base lines of environmental quality, good governance, and personal responsibility have plummeted. This passive acceptance of the ongoing destruction of the seas is all the more shameful given how avoidable the process is. Many solutions exist, and some are relatively simple. For example, governments could create and expand protected marine areas, adopt and enforce stronger international rules to conserve biological diversity in the open ocean, and place a moratorium on the fishing of dwindling fish species, such as Pacific bluefin tuna. But solutions will also require broader changes in how societies approach energy, agriculture, and the management of natural resources. Countries will have to make substantial reductions in greenhouse gas emissions, transition to clean energy, eliminate the worst toxic chemicals, and end the massive nutrient pollution in watersheds.

These challenges may seem daunting, especially for countries focused on basic survival. But governments, international institutions, nongovernmental organizations, scholars, and businesses have the necessary experience and capacity to find answers to the oceans’ problems. And they have succeeded in the past, through innovative local initiatives on every continent, impressive scientific advances, tough environmental regulation and enforcement, and important international measures, such as the global ban on the dumping of nuclear waste in the oceans

So long as pollution, overfishing, and ocean acidification remain concerns only for scientists, however, little will change for the good. Diplomats and national security experts, who understand the potential for conflict in an overheated world, should realize that climate change might soon become a matter of war and peace. Business leaders should understand better than most the direct links between healthy seas and healthy economies. And government officials, who are entrusted with the public’s well-being, must surely see the importance of clean air, land, and water.

The world faces a choice. We do not have to return to an oceanic Stone Age. Whether we can summon the political will and moral courage to restore the seas to health before it is too late is an open question. The challenge and the opportunity are there.

#### Several factors make ocean decline inevitable

#### --- Pollution

Sielen, 13 --- Senior Fellow for International Environmental Policy at the Center for Marine Biodiversity and Conservation at the Scripps Institution of Oceanography (Nov/Dec 2013, Alan B., Foreign Affairs, “The Devolution of the Seas: The Consequences of Oceanic Destruction,” <http://www.foreignaffairs.com/articles/140164/alan-b-sielen/the-devolution-of-the-seas>, JMP)

LAYING WASTE

The oceans’ problems start with pollution, the most visible forms of which are the catastrophic spills from offshore oil and gas drilling or from tanker accidents. Yet as devastating as these events can be, especially locally, their overall contribution to marine pollution pales in comparison to the much less spectacular waste that finds its way to the seas through rivers, pipes, runoff, and the air. For example, trash -- plastic bags, bottles, cans, tiny plastic pellets used in manufacturing -- washes into coastal waters or gets discarded by ships large and small. This debris drifts out to sea, where it forms epic gyres of floating waste, such as the infamous Great Pacific Garbage Patch, which spans hundreds of miles across the North Pacific Ocean.

The most dangerous pollutants are chemicals. The seas are being poisoned by substances that are toxic, remain in the environment for a long time, travel great distances, accumulate in marine life, and move up the food chain. Among the worst culprits are heavy metals such as mercury, which is released into the atmosphere by the burning of coal and then rains down on the oceans, rivers, and lakes; mercury can also be found in medical waste.

Hundreds of new industrial chemicals enter the market each year, most of them untested. Of special concern are those known as persistent organic pollutants, which are commonly found in streams, rivers, coastal waters, and, increasingly, the open ocean. These chemicals build up slowly in the tissues of fish and shellfish and are transferred to the larger creatures that eat them. Studies by the U.S. Environmental Protection Agency have linked exposure to persistent organic pollutants to death, disease, and abnormalities in fish and other wildlife. These pervasive chemicals can also adversely affect the development of the brain, the neurologic system, and the reproductive system in humans.

#### --- Climate change will wreck critical sectors of marine environment

Sielen, 13 --- Senior Fellow for International Environmental Policy at the Center for Marine Biodiversity and Conservation at the Scripps Institution of Oceanography (Nov/Dec 2013, Alan B., Foreign Affairs, “The Devolution of the Seas: The Consequences of Oceanic Destruction,” <http://www.foreignaffairs.com/articles/140164/alan-b-sielen/the-devolution-of-the-seas>, JMP)

IN HOT WATER

As if all this were not enough, scientists estimate that man-made climate change will drive the planet’s temperature up by between four and seven degrees Fahrenheit over the course of this century, making the oceans hotter. Sea levels are rising, storms are getting stronger, and the life cycles of plants and animals are being upended, changing migration patterns and causing other serious disruptions.

Global warming has already devastated coral reefs, and marine scientists now foresee the collapse of entire reef systems in the next few decades. Warmer waters drive out the tiny plants that corals feed on and depend on for their vivid coloration. Deprived of food, the corals starve to death, a process known as “bleaching.” At the same time, rising ocean temperatures promote disease in corals and other marine life. Nowhere are these complex interrelationships contributing to dying seas more than in fragile coral ecosystems.

The oceans have also become more acidic as carbon dioxide emitted into the atmosphere dissolves in the world’s water. The buildup of acid in ocean waters reduces the availability of calcium carbonate, a key building block for the skeletons and shells of corals, plankton, shellfish, and many other marine organisms. Just as trees make wood to grow tall and reach light, many sea creatures need hard shells to grow and also to guard against predators.

On top of all these problems, the most severe impact of the damage being done to the oceans by climate change and ocean acidification may be impossible to predict. The world’s seas support processes essential to life on earth. These include complex biological and physical systems, such as the nitrogen and carbon cycles; photosynthesis, which creates half of the oxygen that humans breathe and forms the base of the ocean’s biological productivity; and ocean circulation. Much of this activity takes place in the open ocean, where the sea and the atmosphere interact. Despite flashes of terror, such as the Indian Ocean earthquake and tsunami of 2004, the delicate balance of nature that sustains these systems has remained remarkably stable since well before the advent of human civilization.

But these complex processes both influence and respond to the earth’s climate, and scientists see certain recent developments as red flags possibly heralding an impending catastrophe. To take one example, tropical fish are increasingly migrating to the cooler waters of the Arctic and Southern oceans. Such changes may result in extinctions of fish species, threatening a critical food source especially in developing countries in the tropics. Or consider that satellite data show that warm surface waters are mixing less with cooler, deeper waters. This reduction in vertical mixing separates near-surface marine life from the nutrients below, ultimately driving down the population of phytoplankton, which is the foundation of the ocean’s food chain. Transformations in the open ocean could dramatically affect the earth’s climate and the complex processes that support life both on land and at sea. Scientists do not yet fully understand how all these processes work, but disregarding the warning signs could result in grave consequences.

#### --- Destruction of habitats from commercial development

Sielen, 13 --- Senior Fellow for International Environmental Policy at the Center for Marine Biodiversity and Conservation at the Scripps Institution of Oceanography (Nov/Dec 2013, Alan B., Foreign Affairs, “The Devolution of the Seas: The Consequences of Oceanic Destruction,” <http://www.foreignaffairs.com/articles/140164/alan-b-sielen/the-devolution-of-the-seas>, JMP)

DESTROYING THE EARTH’S FINAL FRONTIER

Yet another factor driving the decline of the oceans is the destruction of the habitats that have allowed spectacular marine life to thrive for millennia. Residential and commercial development have laid waste to once-wild coastal areas. In particular, humans are eliminating coastal marshes, which serve as feeding grounds and nurseries for fish and other wildlife, filter out pollutants, and fortify coasts against storms and erosion.

#### [Don’t read if aff has overfishing adv]

#### --- Destructive fishing practices

Sielen, 13 --- Senior Fellow for International Environmental Policy at the Center for Marine Biodiversity and Conservation at the Scripps Institution of Oceanography (Nov/Dec 2013, Alan B., Foreign Affairs, “The Devolution of the Seas: The Consequences of Oceanic Destruction,” <http://www.foreignaffairs.com/articles/140164/alan-b-sielen/the-devolution-of-the-seas>, JMP)

TEACH A MAN TO FISH -- THEN WHAT?

Another cause of the oceans’ decline is that humans are simply killing and eating too many fish. A frequently cited 2003 study in the journal Nature by the marine biologists Ransom Myers and Boris Worm found that the number of large fish -- both open-ocean species, such as tuna, swordfish, and marlin, and large groundfish, such as cod, halibut, and flounder -- had declined by 90 percent since 1950. The finding provoked controversy among some scientists and fishery managers. But subsequent studies have confirmed that fish populations have indeed fallen dramatically.

In fact, if one looks back further than 1950, the 90 percent figure turns out to be conservative. As historical ecologists have shown, we are far removed from the days when Christopher Columbus reported seeing large numbers of sea turtles migrating off the coast of the New World, when 15-foot sturgeon bursting with caviar leaped from the waters of the Chesapeake Bay, when George Washington’s Continental army could avoid starvation by feasting on swarms of shad swimming upriver to spawn, when dense oyster beds nearly blocked the mouth of the Hudson River, and when the early-twentieth-century American adventure writer Zane Grey marveled at the enormous swordfish, tuna, wahoo, and grouper he found in the Gulf of California.

Today, the human appetite has nearly wiped those populations out. It’s no wonder that stocks of large predator fish are rapidly dwindling when one considers the fact that one bluefin tuna can go for hundreds of thousands of dollars at market in Japan. High prices -- in January 2013, a 489-pound Pacific bluefin tuna sold for $1.7 million at auction in Tokyo -- make it profitable to employ airplanes and helicopters to scan the ocean for the fish that remain; against such technologies, marine animals don’t stand a chance.

Nor are big fish the only ones that are threatened. In area after area, once the long-lived predatory species, such as tuna and swordfish, disappear, fishing fleets move on to smaller, plankton-eating fish, such as sardines, anchovy, and herring. The overexploitation of smaller fish deprives the larger wild fish that remain of their food; aquatic mammals and sea birds, such as ospreys and eagles, also go hungry. Marine scientists refer to this sequential process as fishing down the food chain.

The problem is not just that we eat too much seafood; it’s also how we catch it. Modern industrial fishing fleets drag lines with thousands of hooks miles behind a vessel, and industrial trawlers on the high seas drop nets thousands of feet below the sea’s surface. In the process, many untargeted species, including sea turtles, dolphins, whales, and large sea birds (such as albatross) get accidentally captured or entangled. Millions of tons of unwanted sea life is killed or injured in commercial fishing operations each year; indeed, as much as a third of what fishermen pull out of the waters was never meant to be harvested. Some of the most destructive fisheries discard 80 to 90 percent of what they bring in. In the Gulf of Mexico, for example, for every pound of shrimp caught by a trawler, over three pounds of marine life is thrown away.

### --- XT: No Fishing Crisis

#### Most U.S. fisheries are recovering now

Plumer, 14 (5/8/2014, Brad, “How the US stopped its fisheries from collapsing,” <http://www.vox.com/2014/5/8/5669120/how-the-us-stopped-its-fisheries-from-collapsing>, JMP)

US fisheries are recovering — with a few glaring exceptions

Back in 1999, NOAA listed 98 stocks as "overfished." Today, that's down to 40. What's more, 34 previously depleted fish stocks have now been "rebuilt" — meaning that they've rebounded to a level that supports the maximum sustainable yield.

Those numbers improved again between 2012 and 2013:

Noaa\_2013\_fisheries

See here for definitions. NOAA

This rebound has been a boon to the fishing industry: US commercial fishermen caught 9.6 billion pounds of seafood in 2012, the second highest total in more than a decade (2011 was the highest year).

The rebound in US fisheries was also noted last year in a separate study by the Natural Resources Defense Council, which studied 44 key fish stocks that had been seriously depleted and found that about 64 percent showed significant signs of recovery.

The study did point out some glaring exceptions. A few regions were struggling to rebuild their fish stocks: New England, the Gulf of Mexico, and the South Atlantic. In New England, certain types of cod, flounder, and white hake simply weren't recovering. (More on this below.)

There are also a bunch of unknowns here: NOAA only assesses about 230 of the 478 types of fish that are under regulation. Steve Murawski, a former scientist at the National Marine Fisheries Service, told me in an interview last year that assessments are complicated and expensive — so NOAA has to "triage" by focusing on the most economically important species.

Still, most experts struck a note of guarded optimism on the state of US fisheries. "There are still a lot of areas where we'd like to see progress, especially in New England," Ted Morton, director of the US oceans program at the Pew Charitable Trusts told me. "But overall we're on the right track."

#### Fish stocks being rebuilt now

Ossola, 14 (5/20/2014, Alexandra, “Tackling the overfishing problem; How one government organization has brought America's overfished populations back from the brink,” <http://scienceline.org/2014/05/tackling-the-overfishing-problem/>, JMP)

Greenhouse gases, sea level rise, energy crisis, factory-farmed meat, deforestation, oil spills, the dead zone in the Gulf – man, we’ve really messed up the environment. At least, that’s what many news-savvy Americans tend to believe. We’re still figuring out what damage is irreparable and what parts can still be salvaged. But in the face of all this gloom, there’s a scaly, smelly glimmer of hope: the fish.

For over a century, the major bodies of water surrounding the United States were drastically overfished. “Prior to 1976, there was no federal legislation that managed U.S. fisheries,” says Ted Morton, the director of Federal US Oceans at the Pew Charitable Trusts, a nonprofit environmental organization. “Fishing was going on, but there was no management system in place that was encompassing all of US waters.” As a result, many groups of fish, like the famous cod or the popular red snapper, were depleted beyond sustainable levels.

Starting in 1997, the National Oceanic and Atmospheric Administration (NOAA) began tracking the status of fish populations with the help of various research institutions and fisheries. What they found was somewhat startling: not only were the vast majority of fish populations overfished, but there were significant regional differences between the east and west coasts.

Knowing the Score

Starting in 2005, NOAA assigned a number to each “fish stock”– a group of single fish species that is considered reproductively independent– to assess its overall health. That number, called a Fish Stock Sustainability Index (FSSI), ranges from 0 to 4 to indicate the fish’s population and known status. If a stock has a higher FSSI number, it is generally in healthier shape and less subject to overfishing. NOAA issues quarterly reports in collaboration with a number different research institutions around the country .

Armed with the FSSI, NOAA started setting annual catch limits for each fish stock, measured by weight. This has been the most successful attempt to oversee a universal reduction in overfishing, says Karen Greene, a representative from NOAA’s Office of Sustainable Fisheries. Since 2000, overall FSSI scores have almost doubled.

Researchers toiled over the past few decades to determine how to keep fish populations sustainable – just how many fish can be removed so that the stock’s reproductive members can keep the population stable. But according to Greene, the process hasn’t been smooth; the initial catch limits are still “a very crude tool” for researchers to understand how much a stock is being overfished.

Coastal Debate

While administrators on the East Coast have spent years tinkering with their catch limits, the West Coast and Alaska already had a leg up in making their stocks sustainable because, according to Greene, catch limits have been in place for a long time. “They have highly productive fisheries there, so they don’t have chronic overfishing problem like in New England,” she says. NOAA biologist Kristan Blackhart agrees, crediting the region’s success to the directors’ focus on streamlining the stock assessment process and reducing bureaucratic excesses.

The NOAA report for the last quarter of 2013 shows that FSSI scores of fish stocks in the Pacific are just slightly higher than those of Atlantic stocks.

Atlantic Pacific

Total FSSI 325.5 168.5

Total number of entries 125 63

Average FSSI score 2.604 2.675

Although the scores are almost equal now, the scores from the East Coast have changed more dramatically in the past decade because those stocks had been overfished longer than any other ocean around the U.S. “There is a longer history of fishing in Northeast, ” Morton says. “It’s really been centuries of effort, even prior to colonial times.” Despite significant progress, many fish stocks are still overfished.

White hake populations are proof that NOAA’s catch limits are working. The less white hake that’s caught, the more that exist in the seas. As NOAA has determined better catch limits, the hake has slowly recovered. Over time, momentum builds: the more fish that are left in the water, the more that can reproduce and augment the stock’s population.

In stark contrast to the white hake, the blue marlin population continues to plummet. A large, popular fish spanning from the coasts of Argentina to Nova Scotia, blue marlin are vulnerable in countries with fewer catch regulations. Rebuilding this population, Greene says, will depend a combined international effort to curtail overfishing.

“A Success in the Making”

Calculated from the FSSI data from late 2013, only 22 percent of stocks have management strategies listed as, “continue rebuilding” or “reduce mortality.” This means the other 78 percent are in good shape and well on their way to being sustainable if they’re not there already.

“I think it’s a success in the making,” says Morton. “As we are transitioning, we are finding out more and more about the status of our fisheries. But we still have to take strides to be sure we have good data to effectively manage them.”

It should be emphasized that as fish stocks continue to rebuild, the FSSI scores won’t necessarily show it. “The trend line is really going to start flattening out,” Greene says. Finely-tuned catch limits for overfished stocks will elevate FSSI scores to their maximum. The improvement on this scale may not be as pronounced, Greene says, but the overall stocks will be healthier. “A lot of scientists say that we’ve already reached the limit in the amount of wild fish that [can be caught sustainably],” Morton says. “We have to be smart about our management and thinking about the needs of future generations.

#### Aff ev is too alarmist --- overhyping the problem decreases support to address it

Kareiva, 10 --- chief scientist at The Nature Conservancy and has worked at the NOAA (11/29/2010, Peter, “Why Do We Keep Hearing Global Fisheries Are Collapsing?” <http://blog.nature.org/conservancy/2010/11/29/fisheries-apocalypse-ocean-fish-stock-peter-kareiva-ray-hilborn/>, JMP)

I have been quantitatively analyzing environmental data for 30 years in a wide variety of arenas (biotechnology, endangered species, agriculture, fisheries, etc). I am sad to report that, on average, the conservation and environmental community errs on the side of being unduly alarmist and apocalyptic in interpreting the data we have, to the detriment of being solution-oriented.

Nowhere was this more apparent to me than when I worked for NOAA’s fisheries division and got to learn up close how committed and rigorous NOAA’s scientists were about finding ways to protect the nation’s fisheries. Yes, there is coastal degradation in the United States and there are fisheries that have collapsed. But there are also well-managed fisheries — something you almost never hear about. And it is these success stories that can tell us what we need to do to reverse our failures.

I am no Pollyanna — the public’s growing disconnect from climate issues troubles me deeply. But when scientists analyze and extrapolate data using methods that are open to debate and then firmly conclude with statements such as, “Our analyses suggest that business-as-usual would foreshadow serious threats to global food security, coastal water quality, and ecosystem stability, affecting current and future generations,” I wonder what is being accomplished? Have we not learned that scaring people paralyzes them instead of motivating them to act?

For The Conservancy’s science magazine, Science Chronicles, the world renowned fisheries biologist Ray Hilborn just wrote a fascinating essay examining the doom-and-gloom rhetoric surrounding the state of marine fisheries. For sure, there is another side to the story, and there are scientists who would disagree with Ray. But it is important that the conservation community and the public learn to think skeptically about messages of a forthcoming apocalypse as well as about messages of “everything is wonderful.” Our marine fisheries are too important to the world’s economy and food supply to waste energy on emotional rhetoric — our oceans demand cool-headed analyses and data-based solutions that work. Ray’s essay (reprinted below) about why all the world’s fisheries are not collapsing is a good place to start.

#### No overall fishing collapse --- positive trend

AP, 9 (7/31/2009, “Sustainable seas? Overfishing easing in places; Of 10 ecosystems studied, 3 still overfished but 5 are seen as improving,” <http://www.nbcnews.com/id/32222783/ns/world_news-world_environment>, JMP)

WASHINGTON — Crabcakes and fish sticks won't be disappearing after all.

Two years after a study warned that overfishing could cause a collapse in the world's seafood stocks by 2048, an update says the tide is turning, at least in some areas.

"This paper shows that our oceans are not a lost cause," said Boris Worm of Dalhousie University in Halifax, Nova Scotia, lead author of both reports. "I'm somewhat more hopeful ... than what we were seeing two years ago."

It's personal as well as scientific.

"I have actually given thought to whether I will be hosting a seafood party then," Worm said, meaning 2048.

Ray Hilborn of the University of Washington challenged Worm's original report, leading the two — plus 19 other researchers — to launch the study that led to the new findings. They're being published in Friday's edition of the journal Science.

The news isn't all good.

Of 10 areas of the world that were studied, significant overfishing continues in three, but steps have been taken to curb excesses in five others, Hilborn and Worm report. The other two were not a problem in either study.

#### This is based on the best study

AP, 9 (7/31/2009, “Sustainable seas? Overfishing easing in places; Of 10 ecosystems studied, 3 still overfished but 5 are seen as improving,” <http://www.nbcnews.com/id/32222783/ns/world_news-world_environment>, JMP)

"Prior to this study, evaluations of the status of world fish stocks and communities were based on catch records for lack of a better alternative. Results were controversial because catch trends may not give an accurate picture of the trends in fish abundance," Ana Parma of Centro Nacional Patagonico in Argentina, said in a statement.

"This is the first exhaustive attempt to assemble the best-available data on the status of marine fisheries and trends in exploitation rates," she said. The new analysis includes catch data, stock assessments, scientific trawl surveys, small-scale fishery data and computer modeling results.

The research was funded by the National Science Foundation and the University of California, Santa Barbara.

#### Many fish stocks being rebuilt now --- they overlook more optimistic data

Hilborn, 10 --- Professor, Aquatic and Fishery Sciences, University of Washington (November 2010, Ray, “Apocalypse Forestalled: Why All the World’s Fisheries Aren’t Collapsing,” <http://www.atsea.org/doc/Hilborn%202010%20Science%20Chronicles%202010-11-1.pdf>, JMP)

**\*\*\*Note NCEAS = National Center for Ecological Analysis and Synthesis**

The database generated by the NCEAS group and subsequent analysis has shown that many of the assumptions fueling the standard apocalyptic scenarios painted by the gloom-and-doom proponents are untrue:

• For instance, the widespread notion that fishermen generally sequentially deplete food webs (Pauly et al. 1998) — starting with the predators and working their way down — is simply not supported by data.

• Declining trophic level of fishery landings is just as often a result of new fisheries developing rather than old ones collapsing (Essington et al. 2006).

• Catch data also show that fishing patterns are driven by economics, with trophic level a poor predictor of exploitation history (Sethi et al. 2010).

• Furthermore, the mean trophic level of marine ecosystems is unrelated to (or even negatively correlated with) the trophic level of fishery landings (Branch et al. 2010).

• And the oft-cited assessment that the large fish of the oceans were collapsed by 1980 (Myers and Worm 2003) is totally inconsistent with the database we have assembled — for instance, world tuna stocks in total are at present well above the level that would produce maximum sustained yield, except bluefin tuna and some other billfish that are depleted (Hutchings 2010).

Nevertheless, many in the marine conservation community appear unwilling to accept these results, continue to insist that all fish may be gone by 2048, and use declining catches in fisheries where regulations have reduced catches as indications of stock collapse.

No one argues that all fisheries are well-managed, and so far we do not have abundance estimates for many parts of the world, especially Asia and Africa. Using the catch-based methods of Worm et al. (2006) and Pauly, these areas appear to have fewer stock collapses and overfished stocks than in the areas for which we have abundance data. However, we do not know if these areas have been reducing exploitation rates or if they are still increasing.

Finally, in places without strong central government control of fishing, there is broad agreement that community-based comanagement can be effective. For these fisheries, management tools are very different than those used for industrial fishery stocks, and MPAs are here often a key ingredient. The lessons from the Worm et al. (2009) paper about what works to rebuild fish stocks are applicable to industrial fisheries, but probably not to the small-scale fisheries that support many fishing communities.

There is considerable room for policy debate about where we want to be in the tradeoff between yield and environmental impact of fishing. There is no denying that sustainable fishing changes ecosystems, and that different societies will almost certainly make different choices about how much environmental change they will accept in return for sustainable food production. But science cannot provide the answers for this debate; it can only evaluate the tradeoffs.

My perspective is that we need to treat fisheries like medical diagnoses. We must identify which fisheries are in trouble and find the cures for those individual fisheries. The evidence is strong that we can and are rebuilding stocks in many places. Let us accept that progress and identify the problem stocks and how to fix them.

Apocalyptic assertions that fisheries management is failing are counterproductive — not only because these assertions are untrue, but because they fail to recognize the long, hard work of fishery managers, scientists and stakeholders in the many places where management is working. While the gloom-and-doom advocates have been attracting public attention and press coverage, thousands of people — decried by Pauly (2009b) as agents of the commercial fishing interests — have worked through years of meetings and painful catch and effort reductions to lower fishing pressure and successfully rebuild fisheries. SC

#### Fisheries recovering now

Zabarenko, 9 --- Environment Correspondent (7/30/2009, Deborah, “World fisheries collapse can be averted – study,” <http://www.reuters.com/article/2009/07/30/idUSN30463>, JMP)

WASHINGTON, July 30 (Reuters) - The world's commercial fisheries, pressured by overfishing and threatened with possible collapse by mid-century, could be rebuilt with careful management, researchers reported on Thursday.

In fact, a fisheries expert who in 2006 predicted total global collapse of fish and seafood populations by 2048 is more optimistic of recovery, based on a wide-ranging two-year study by scientists in North and South America, Africa, Australia and New Zealand.

Still, 63 percent of fish stocks worldwide need to be rebuilt, the researchers said.

"I am somewhat more hopeful that we will be in a better state ... than what we originally predicted, simply because I see that we have the management tools that are proven to work," said Boris Worm of Dalhousie University in Halifax, Nova Scotia, Canada. He is a co-author of a paper in the journal Science and also an author of the pessimistic 2006 report.

These tools include: restrictions on gear like nets so that smaller, younger fish can escape; limits on the total allowable catch; closing some areas to fishing; certifying fisheries as sustainable; offering shares of the total allowable catch to each person who fishes in a specified area.

Worm's optimism was provisional, however, because the current research only looked at about one-quarter of the world's marine ecosystems, mostly in the developed world where data is plentiful and management can be monitored and enforced.

Of the 10 major ecosystems they studied, the scientists found five marine areas have cut the average percentage of fish they take, relative to estimates of the total number of fish. Two other ecosystems were never overexploited, leaving three areas overexploited.

### --- XT: Laundry List Alt Causes

#### Number of other alt causes too

Sielen, 13 --- Senior Fellow for International Environmental Policy at the Center for Marine Biodiversity and Conservation at the Scripps Institution of Oceanography (Nov/Dec 2013, Alan B., Foreign Affairs, “The Devolution of the Seas: The Consequences of Oceanic Destruction,” <http://www.foreignaffairs.com/articles/140164/alan-b-sielen/the-devolution-of-the-seas>, JMP)

Relatively new problems present additional challenges. Invasive species, such as lionfish, zebra mussels, and Pacific jellyfish, are disrupting coastal ecosystems and in some cases have caused the collapse of entire fisheries. Noise from sonar used by military systems and other sources can have devastating effects on whales, dolphins, and other marine life. Large vessels speeding through busy shipping lanes are also killing whales. Finally, melting Arctic ice creates new environmental hazards, as wildlife habitats disappear, mining becomes easier, and shipping routes expand.

### --- XT: Pollution Alt Cause

#### Nutrients and fertilizer for farming wreck ocean environment and cause dead zones

Sielen, 13 --- Senior Fellow for International Environmental Policy at the Center for Marine Biodiversity and Conservation at the Scripps Institution of Oceanography (Nov/Dec 2013, Alan B., Foreign Affairs, “The Devolution of the Seas: The Consequences of Oceanic Destruction,” <http://www.foreignaffairs.com/articles/140164/alan-b-sielen/the-devolution-of-the-seas>, JMP)

Then there are the nutrients, which increasingly show up in coastal waters after being used as chemical fertilizers on farms, often far inland. All living things require nutrients; excessive amounts, however, wreak havoc on the natural environment. Fertilizer that makes its way into the water causes the explosive growth of algae. When these algae die and sink to the sea floor, their decomposition robs the water of the oxygen needed to support complex marine life. Some algal blooms also produce toxins that can kill fish and poison humans who consume seafood.

The result has been the emergence of what marine scientists call “dead zones” -- areas devoid of the ocean life people value most. The high concentration of nutrients flowing down the Mississippi River and emptying into the Gulf of Mexico has created a seasonal offshore dead zone larger than the state of New Jersey. An even larger dead zone -- the world’s biggest -- can be found in the Baltic Sea, which is comparable in size to California. The estuaries of China’s two greatest rivers, the Yangtze and the Yellow, have similarly lost their complex marine life. Since 2004, the total number of such aquatic wastelands worldwide has more than quadrupled, from 146 to over 600 today.

### --- XT: Destructive Fishing Alt Cause

#### Destructive fishing practices are destroying marine ecosystems

Sielen, 13 --- Senior Fellow for International Environmental Policy at the Center for Marine Biodiversity and Conservation at the Scripps Institution of Oceanography (Nov/Dec 2013, Alan B., Foreign Affairs, “The Devolution of the Seas: The Consequences of Oceanic Destruction,” <http://www.foreignaffairs.com/articles/140164/alan-b-sielen/the-devolution-of-the-seas>, JMP)

Hidden from view but no less worrying is the wholesale destruction of deep-ocean habitats. For fishermen seeking ever more elusive prey, the depths of the seas have become the earth’s final frontier. There, submerged mountain chains called seamounts -- numbering in the tens of thousands and mostly uncharted -- have proved especially desirable targets. Some rise from the sea floor to heights approaching that of Mount Rainier, in Washington State. The steep slopes, ridges, and tops of seamounts in the South Pacific and elsewhere are home to a rich variety of marine life, including large pools of undiscovered species.

Today, fishing vessels drag huge nets outfitted with steel plates and heavy rollers across the sea floor and over underwater mountains, more than a mile deep, destroying everything in their path. As industrial trawlers bulldoze their way along, the surfaces of seamounts are reduced to sand, bare rock, and rubble. Deep cold-water corals, some older than the California redwoods, are being obliterated. In the process, an unknown number of species from these unique islands of biological diversity -- which might harbor new medicines or other important information -- are being driven extinct before humans even get a chance to study them.

### 1nc Biodiversity / Environment Impact

#### Marine ecosystems are resilient — no system collapse

Kennedy 2 — Victor Kennedy, PhD Environmental Science and Dir. Cooperative Oxford Lab (“Coastal and Marine Ecosystems and Global Climate Change,” Pew Center on Global Climate Change, Available Online: <http://www.c2es.org/docUploads/marine_ecosystems.pdf>, Accessed: 09/02/2013)

There is evidence that marine organisms and ecosystems are resilient to environmental change. Steele (1991) hypothesized that the biological components of marine systems are tightly coupled to physical factors, allowing them to respond quickly to rapid environmental change and thus rendering them ecologically adaptable. Some species also have wide genetic variability throughout their range, which may allow for adaptation to climate change.

#### No impact --- humans and the environment are adaptable

Doremus, 2000 – Professor of Law at UC Davis

(Holly, Washington & Lee Law Review, “The Rhetoric and Reality of Nature Protection: Toward a New Discourse,” Winter 2000, 57 Wash & Lee L. Rev. 11, JMP)

In recent years, this discourse frequently has taken the form of the ecological horror story. That too is no mystery. The ecological horror story is unquestionably an attention-getter, especially in the hands of skilled writers [\*46] like Carson and the Ehrlichs. The image of the airplane earth, its wings wobbling as rivet after rivet is carelessly popped out, is difficult to ignore. The apocalyptic depiction of an impending crisis of potentially dire proportions is designed to spur the political community to quick action. Furthermore, this story suggests a goal that appeals to many nature lovers: that virtually everything must be protected. To reinforce this suggestion, tellers of the ecological horror story often imply that the relative importance of various rivets to the ecological plane cannot be determined. They offer reams of data and dozens of anecdotes demonstrating the unexpected value of apparently useless parts of nature. The moth that saved Australia from prickly pear invasion, the scrubby Pacific yew, and the downright unattractive leech are among the uncharismatic flora and fauna who star in these anecdotes. n211 The moral is obvious: because we cannot be sure which rivets are holding the plane together, saving them all is the only sensible course.

Notwithstanding its attractions, the material discourse in general, and the ecological horror story in particular, are not likely to generate policies that will satisfy nature lovers. The ecological horror story implies that there is no reason to protect nature until catastrophe looms. The Ehrlichs' rivet-popper account, for example, presents species simply as the (fungible) hardware holding together the ecosystem. If we could be reasonably certain that a particular rivet was not needed to prevent a crash, the rivet-popper story suggests that we would lose very little by pulling it out. Many environmentalists, though, would disagree. n212

Reluctant to concede such losses, tellers of the ecological horror story highlight how close a catastrophe might be, and how little we know about what actions might trigger one. But the apocalyptic vision is less credible today than it seemed in the 1970s. Although it is clear that the earth is experiencing a mass wave of extinctions, n213 the complete elimination of life on earth seems unlikely.n214 Life is remarkably robust. Nor is human extinction probable any time soon. Homo sapiens is adaptable to nearly any environment. Even if the world of the future includes far fewer species, it likely will hold people. n215

One response to this credibility problem tones the story down a bit, arguing not that humans will go extinct but that ecological disruption will bring economies, and consequently civilizations, to their knees. n216 But this too may be overstating the case. Most ecosystem functions are performed by multiple species. This functional redundancy means that a high proportion of species can be lost without precipitating a collapse. n217

### --- XT: Biodiversity Impact Answers

#### No impact to biodiversity

Sagoff 97  Mark, Senior Research Scholar – Institute for Philosophy and Public policy in School of Public Affairs – U. Maryland, William and Mary Law Review, “INSTITUTE OF BILL OF RIGHTS LAW SYMPOSIUM DEFINING TAKINGS: PRIVATE PROPERTY AND THE FUTURE OF GOVERNMENT REGULATION: MUDDLE OR MUDDLE THROUGH? TAKINGS JURISPRUDENCE MEETS THE ENDANGERED SPECIES ACT”, 38 Wm and Mary L. Rev. 825, March, L/N

Note – Colin Tudge - Research Fellow at the Centre for Philosophy at the London School of Economics. Frmr Zoological Society of London: Scientific Fellow and tons of other positions. PhD. Read zoology at Cambridge.

Simon Levin = Moffet Professor of Biology, Princeton. 2007 American Institute of Biological Sciences Distinguished Scientist Award 2008 Istituto Veneto di Scienze Lettere ed Arti 2009 Honorary Doctorate of Science, Michigan State University 2010 Eminent Ecologist Award, Ecological Society of America 2010 Margalef Prize in Ecology, etc… PhD

Although one may agree with ecologists such as Ehrlich and Raven that the earth stands on **the brink of** an episode of **massive extinction, it may not follow** from this grim fact **that human** being**s will suffer** as a result. On the contrary, skeptics such as science writer Colin Tudge have challenged biologists to explain **why we need more than a tenth of the 10 to 100 million species that grace the earth**. Noting that "cultivated systems often out-produce wild systems by 100-fold or more," Tudge declared that "the argument that humans need the variety of other species is, when you think about it, a theological one." n343 Tudge observed that "the elimination of all but a tiny minority **of our fellow creatures does not affect the material well-being of humans** one iota."n344 This skeptic challenged ecologists to list more than 10,000 species (other than unthreatened microbes) that are essential to ecosystem productivity or functioning. n345 "**The human species could survive just as well** if 99.9% of our fellow creatures went extinct, provided only that we retained the appropriate 0.1% that we need." n346   [\*906]   The monumental Global Biodiversity Assessment ("the Assessment") identified two positions with respect to redundancy of species. "At one extreme is the idea that each species is unique and important, such that its removal or loss will have demonstrable consequences to the functioning of the community or ecosystem." n347 The authors of the Assessment, a panel of eminent ecologists, endorsed this position, saying it is "unlikely that there is much, if any, ecological redundancy in communities over time scales of decades to centuries, the time period over which environmental policy should operate." n348 These eminent ecologists rejected the opposing view, "the notion that species overlap in function to a sufficient degree that removal or loss of a species will be compensated by others, with negligible overall consequences to the community or ecosystem." n349  Other biologists believe, however, that species are so fabulously redundant in the ecological functions they perform that the life-support systems and processes of the planet and ecological processes in general will function perfectly well with fewer of them, certainly fewer than the millions and millions we can expect to remain **even if** **every threatened organism becomes extinct**. n350 Even the kind of sparse and miserable world depicted in the movie Blade Runner could provide a "sustainable" context for the human economy as long as people forgot their aesthetic and moral commitment to the glory and beauty of the natural world. n351 The Assessment makes this point. "Although any ecosystem contains hundreds to thousands of species interacting among themselves and their physical environment, the emerging consensus is that the system is driven by a small number of . . . biotic variables on whose interactions the balance of species are, in a sense, carried along." n352   [\*907]   To make up your mind on the question of the functional redundancy of species, consider an endangered species of bird, plant, or insect and ask how the ecosystem would fare in its absence. The fact that the creature is endangered suggests an answer: it is already in limbo as far as ecosystem processes are concerned. What crucial ecological services does the black-capped vireo, for example, serve? Are any of the species threatened with extinction necessary to the provision of any ecosystem service on which humans depend? If so, which ones are they?  Ecosystems and the species that compose them have changed, dramatically, continually, and totally in virtually every part of the United States. There is little ecological similarity, for example, between New England today and the land where the Pilgrims died. n353 In view of the constant reconfiguration of the biota, **one may wonder why Americans have not suffered more as a result of ecological catastrophes**. The cast of species in nearly every environment changes constantly-local extinction is commonplace in nature-but the crops still grow. Somehow, it seems, property values keep going up on Martha's Vineyard in spite of the tragic disappearance of the heath hen.  One might argue that the sheer number and variety of creatures available to any ecosystem buffers that system against stress. Accordingly, we should be concerned if the "library" of creatures ready, willing, and able to colonize ecosystems gets too small. (Advances in genetic engineering may well permit us to write a large number of additions to that "library.") In the United States as in many other parts of the world, however, the number of species has been increasing dramatically, not decreasing, as a result of human activity. This is because the hordes of exotic species coming into ecosystems in the United States far exceed the number of species that are becoming extinct. Indeed, introductions may outnumber extinctions by more than ten to one, so that the United States is becoming more and more species-rich all the time largely as a result of human action. n354 [\*908] Peter Vitousek and colleagues estimate that over 1000 non-native plants grow in California alone; in Hawaii there are 861; in Florida, 1210. n355 In Florida more than 1000 non-native insects, 23 species of mammals, and about 11 exotic birds have established themselves. n356 Anyone who waters a lawn or hoes a garden knows how many weeds desire to grow there, how many birds and bugs visit the yard, and how many fungi, creepy-crawlies, and other odd life forms show forth when it rains. All belong to nature, from wherever they might hail, but not many homeowners would claim that there are too few of them. Now, not all exotic species provide ecosystem services; indeed, some may be disruptive or have no instrumental value. n357 This also may be true, of course, of native species as well, especially because all exotics are native somewhere. Certain exotic species, however, such as Kentucky blue grass, establish an area's sense of identity and place; others, such as the green crabs showing up around Martha's Vineyard, are nuisances. n358 Consider an analogy [\*909] with human migration. Everyone knows that after a generation or two, immigrants to this country are hard to distinguish from everyone else. The vast majority of Americans did not evolve here, as it were, from hominids; most of us "came over" at one time or another. This is true of many of our fellow species as well, and they may fit in here just as well as we do. It is possible to distinguish exotic species from native ones for a period of time, just as we can distinguish immigrants from native-born Americans, but as the centuries roll by, species, like people, fit into the landscape or the society, changing and often enriching it. Shall we have a rule that a species had to come over on the Mayflower, as so many did, to count as "truly" American? Plainly not. When, then, is the cutoff date? Insofar as we are concerned with the absolute numbers of "rivets" holding ecosystems together, extinction seems not to pose a general problem because a far greater number of kinds of mammals, insects, fish, plants, and other creatures thrive on land and in water in America today than in prelapsarian times. n359 The Ecological Society of America has urged managers to maintain biological diversity as a critical component in strengthening ecosystems against disturbance. n360 Yet as Simon Levin observed, "much of the detail about species composition will be irrelevant in terms of influences on ecosystem properties." n361 [\*910] He added: "For net primary productivity, as is likely to be the case for any system property, **biodiversity matters only up to a point**; above a certain level, increasing biodiversity is likely to make **little difference**." n362 What about the use of plants and animals in agriculture? There is no scarcity foreseeable. "Of an estimated 80,000 types of plants [we] know to be edible," a U.S. Department of the Interior document says, "only about 150 are extensively cultivated." n363 About twenty species, not one of which is endangered, provide ninety percent of the food the world takes from plants. n364 Any new food has to take "shelf space" or "market share" from one that is now produced. Corporations also find it difficult to create demand for a new product; for example, people are not inclined to eat paw-paws, even though they are delicious. It is hard enough to get people to eat their broccoli and lima beans. It is harder still to develop consumer demand for new foods. This may be the reason the Kraft Corporation does not prospect in remote places for rare and unusual plants and animals to add to the world's diet. Of the roughly 235,000 flowering plants and 325,000 nonflowering plants (including mosses, lichens, and seaweeds) available, farmers ignore virtually all of them in favor of a very few that are profitable. n365 To be sure, any of the more than 600,000 species of plants could have an application in agriculture, but would they be preferable to the species that are now dominant? Has anyone found any consumer demand for any of these half-million or more plants to replace rice or wheat in the human diet? There are reasons that farmers cultivate rice, wheat, and corn rather than, say, Furbish's lousewort. There are many kinds of louseworts, so named because these weeds were thought to cause lice in sheep. How many does agriculture really require? [\*911] The species on which agriculture relies are domesticated, not naturally occurring; they are developed by artificial not natural selection; they might not be able to survive in the wild. n366 This argument is not intended to deny the religious, aesthetic, cultural, and moral reasons that command us to respect and protect the natural world. These spiritual and ethical values should evoke action, of course, but we should also recognize that they are spiritual and ethical values. We should recognize that ecosystems and all that dwell therein compel our moral respect, our aesthetic appreciation, and our spiritual veneration; we should clearly seek to achieve the goals of the ESA. There is no reason to assume, however, that these goals have anything to do with human well-being or welfare as economists understand that term. These are ethical goals, in other words, not economic ones. Protecting the marsh may be the right thing to do for moral, cultural, and spiritual reasons. We should do it-but someone will have to pay the costs. In the narrow sense of promoting human welfare, protecting nature often represents a net "cost," not a net "benefit." It is largely for moral, not economic, reasons-ethical, not prudential, reasons- that we care about all our fellow creatures. They are valuable as objects of love not as objects of use. What is good for   [\*912]  the marsh may be good in itself even if it is not, in the economic sense, good for mankind. The most valuable things are quite useless.

#### No impact to biodiversity – previous mass extinctions prove

National Geographic no date (“Mass Extinctions, What Causes Animal Die Offs?,” National Geographic, Date Provided by the Wayback Machine, 2010, science.nationalgeographic.com, Available Online: https://science.nationalgeographic.com/prehistoric-world/mass-extinction, Accessed: 09/02/2013)

More than 90 percent of all organisms that have ever lived on Earth are extinct. As new species evolve to fit ever changing ecological niches, older species fade away. But [the rate](##) of extinction is far from constant. At least a handful of times in the last 500 million years, 50 to more than 90 percent of all species on Earth have disappeared in a geological blink of the eye. Though these mass extinctions are deadly events, they open up the planet for new life-forms to emerge. Dinosaurs appeared after one of the biggest mass extinction events on Earth, the Permian-Triassic extinction about 250 million years ago. The most studied mass extinction, between the Cretaceous and Paleogene periods about 65 million years ago, killed off the dinosaurs and made room for mammals to rapidly diversify and evolve.

### 1nc Food Security Impact

#### Food security improving now

Financial Times, 5/28 (“Boost for global food security,” 5/28/2014, <http://blogs.ft.com/the-world/2014/05/boost-for-global-food-security/>, JMP)

Some good news for a change. Food security - the availability and affordability of food – has got better, according to research published on Wednesday.

The 66-page report from the Economist Intelligence Unit, sponsored by DuPont, the chemicals company, found that despite last year’s freak weather patterns - drought in California, heatwaves in Australia and floods in Russia – food security improved in almost three-quarters of the world’s countries.

Food security is a growing concern, given the expectation that the world’s population is likely to peak at 10bn mid-century, meaning an extra 3bn mouths to feed.

The biggest improvements were in countries with the worst food security problems, namely sub-Saharan Africa, where only two – South Africa and Botswana – have a global food security index of more than 50 per cent.

This has led to a narrowing of the gap with the most food-secure countries – headed by the US – where improvements were slower.

Lower wheat and rice prices were behind the improvement, as was a better world economy. The EIU report backs up the Food and Agriculture Organisation’s recent research showing a fall in the number of hungry people from 868m in 2010-12 to 842m – still 12 per cent of the global population.

#### Food insecurity empirically doesn’t cause conflict

Salehyan 7 – Professor of Political Science at the University of North Texas. (Idean, 6-14 “The New Myth About Climate Change Corrupt, tyrannical governments—not changes in the Earth’s climate—will be to blame for the coming resource wars.” <http://www.foreignpolicy.com/articles/2007/08/13/the_new_myth_about_climate_change>)

First, aside from a few anecdotes, there is little systematic empirical evidence that resource scarcity and changing environmental conditions lead to conflict. In fact, several studies have shown that an abundance of natural resources is more likely to contribute to conflict. Moreover, even as the planet has warmed, the number of civil wars and insurgencies has decreased dramatically. Data collected by researchers at Uppsala University and the International Peace Research Institute, Oslo shows a steep decline in the number of armed conflicts around the world. Between 1989 and 2002, some 100 armed conflicts came to an end, including the wars in Mozambique, Nicaragua, and Cambodia. If global warming causes conflict, we should not be witnessing this downward trend. Furthermore, if famine and drought led to the crisis in Darfur, why have scores of environmental catastrophes failed to set off armed conflict elsewhere? For instance, the U.N. World Food Programme warns that 5 million people in Malawi have been experiencing chronic food shortages for several years. But famine-wracked Malawi has yet to experience a major civil war. Similarly, the Asian tsunami in 2004 killed hundreds of thousands of people, generated millions of environmental refugees, and led to severe shortages of shelter, food, clean water, and electricity. Yet the tsunami, one of the most extreme catastrophes in recent history, did not lead to an outbreak of resource wars. Clearly then, there is much more to armed conflict than resource scarcity and natural disasters.

#### Wars are mostly regional – won’t escalate internationally

Allouche 11 – fellow at the Institute of Development Studies at Brighton, UK (Jeremy, "The sustainability and resilience of global water and food systems: Political analysis of the interplay between security, resource scarcity, political systems and global trade" Food Policy, Volume 36, Supplement 1)

This article has provided an overview of the current and future challenges in terms of global food and water systems. The major focus of the argument has been on how resource scarcity is a contested and subjective concept which cannot fully explain conflict, political instability or food insecurity. The politics of inequality and allocation are much more important variables in explaining water and food insecurity. This is particularly true for conflicts. Although resource scarcity has been linked to international wars, the current data shows that most conflict over water and food are much more local. But there again, although resource scarcity can be linked to malnutrition, hunger and water insecurity, in the majority of cases, water and food insecurity are rarely about competition over resources but rather reflect the politics of allocation and inequality. In this respect, war and conflicts aggravate these insecurities not just on the short term but also on the long term. At the global level, food security has considerably improved and provides the means to address these insecurities. Trade can certainly be seen as a way to address access for countries that are under severe stress in terms of food and water and provides logical grounds for questioning the various water and food wars scenarios. Although global trade and technological innovation are key drivers in providing stable and resilient global systems, the most destabilizing global water-related threat is increasing food prices and hunger. Overall, decision-makers should show greater concern for the human beings who make their living in agriculture, so that those at risk of livelihood and food-security failures, especially under anticipated scenarios of climate change, will be less deprived. Current debates linked to global food security and climate fail to address the political dimension of resource scarcity which is primarily linked to the politics of inequality, gender and power.

### --- XT: Food Security Improving Now

#### Food security improving now

Dupont, 5/28 (“Global Food Security Index Improves,” 5/28/2014, <http://nationalhogfarmer.com/environment/global-food-security-index-improves>, JMP)

The question of global food security is significant, but a new report from the Economist Intelligence Unit (EIU) sponsored by DuPont offers improving grades on an important report card. The 2014 Global Food Security Index shows that 70 percent of countries in the study saw food security scores rise over the previous year.

This index, which measures 28 different food security indicators, looks at the issue for 109 countries. Craig F. Binetti, president, DuPont Nutrition and Health, comments: "The index provides a common set of metrics that enable us to track progress in food security globally, and the outcomes thus far are promising. But we know it will take continued collaboration, innovation and investment in agriculture, food and nutrition to overcome the vast challenges to feeding the world's growing population."

With the prospect of feeding 9 billion people by 2050, food security is a global issue. Food prices are a key factor impacting security, with many in the developing world already spend half to three-quarters of their income on food. Rising worries over water availability and access to arable land, add to the food security challenge.

The index showed that every region improved from the prior year, but most progress was seen in Sub-Saharan Africa, driven primarily by improved political stability and economic growth, despite the food-insecure-environment. The index slid for Central and South America and Asia Pacific as diet diversification fell and there was a decline in public spending on agricultural research.

In developing countries, the index shows the key challenges include inadequate infrastructure, political risk and food price inflation. For developed countries, the challenges include adapting to urbanization and the continued rise of obesity.

### --- XT: Food Security Impact Answers

#### Their neo-Malthusian claims are false – food scarcity doesn’t cause war

Allouche 11 – fellow at the Institute of Development Studies at Brighton, UK (Jeremy, "The sustainability and resilience of global water and food systems: Political analysis of the interplay between security, resource scarcity, political systems and global trade" Food Policy, Volume 36, Supplement 1)

The question of resource scarcity has led to many debates on whether scarcity (whether of food or water) will lead to conflict and war. The underlining reasoning behind most of these discourses over food and water wars comes from the Malthusian belief that there is an imbalance between the economic availability of natural resources and population growth since while food production grows linearly, population increases exponentially. Following this reasoning, neo-Malthusians claim that finite natural resources place a strict limit on the growth of human population and aggregate consumption; if these limits are exceeded, social breakdown, conflict and wars result. Nonetheless, it seems that most empirical studies do not support any of these neo-Malthusian arguments. Technological change and greater inputs of capital have dramatically increased labour productivity in agriculture. More generally, the neo-Malthusian view has suffered because during the last two centuries humankind has breached many resource barriers that seemed unchallengeable. Lessons from history: alarmist scenarios, resource wars and international relations In a so-called age of uncertainty, a number of alarmist scenarios have linked the increasing use of water resources and food insecurity with wars. The idea of water wars (perhaps more than food wars) is a dominant discourse in the media (see for example Smith, 2009), NGOs (International Alert, 2007) and within international organizations (UNEP, 2007). In 2007, UN Secretary General Ban Ki-moon declared that ‘water scarcity threatens economic and social gains and is a potent fuel for wars and conflict’ (Lewis, 2007). Of course, this type of discourse has an instrumental purpose; security and conflict are here used for raising water/food as key policy priorities at the international level. In the Middle East, presidents, prime ministers and foreign ministers have also used this bellicose rhetoric. Boutrous Boutros-Gali said; ‘the next war in the Middle East will be over water, not politics’ (Boutros Boutros-Gali in Butts, 1997, p. 65). The question is not whether the sharing of transboundary water sparks political tension and alarmist declaration, but rather to what extent water has been a principal factor in international conflicts. The evidence seems quite weak. Whether by president Sadat in Egypt or King Hussein in Jordan, none of these declarations have been followed up by military action**.** The governance of transboundary water has gained increased attention these last decades. This has a direct impact on the global food system as water allocation agreements determine the amount of water that can used for irrigated agriculture. The likelihood of conflicts over water is an important parameter to consider in assessing the stability, sustainability and resilience of global food systems. None of the various and extensive databases on the causes of war show water as a casus belli. Using the International Crisis Behavior (ICB) data set and supplementary data from the University of Alabama on water conflicts, Hewitt, Wolf and Hammer found only seven disputes where water seems to have been at least a partial cause for conflict (Wolf, 1998, p. 251). In fact, about 80% of the incidents relating to water were limited purely to governmental rhetoric intended for the electorate (Otchet, 2001, p. 18). As shown in The Basins At Risk (BAR) water event database, more than two-thirds of over 1800 water-related ‘events’ fall on the ‘cooperative’ scale (Yoffe et al., 2003). Indeed, if one takes into account a much longer period, the following figures clearly demonstrate this argument. According to studies by the United Nations Food and Agriculture Organization (FAO), organized political bodies signed between the year 805 and 1984 more than 3600 water-related treaties, and approximately 300 treaties dealing with water management or allocations in international basins have been negotiated since 1945 ([FAO, 1978] and [FAO, 1984]). The fear around water wars have been driven by a Malthusian outlook which equates scarcity with violence, conflict and war. There is however no direct correlation between water scarcity and transboundary conflict. Most specialists now tend to agree that the major issue is not scarcity per se but rather the allocation of water resources between the different riparian states (see for example [Allouche, 2005], [Allouche, 2007] and [Rouyer, 2000]). Water rich countries have been involved in a number of disputes with other relatively water rich countries (see for example India/Pakistan or Brazil/Argentina). The perception of each state’s estimated water needs really constitutes the core issue in transboundary water relations. Indeed, whether this scarcity exists or not in reality, perceptions of the amount of available water shapes people’s attitude towards the environment (Ohlsson, 1999). In fact, some water experts have argued that scarcity drives the process of co-operation among riparians ([Dinar and Dinar, 2005] and [Brochmann and Gleditsch, 2006]). In terms of international relations, the threat of water wars due to increasing scarcity does not make much sense in the light of the recent historical record. Overall, the water war rationale expects conflict to occur over water, and appears to suggest that violence is a viable means of securing national water supplies, an argument which is highly contestable. The debates over the likely impacts of climate change have again popularised the idea of water wars. The argument runs that climate change will precipitate worsening ecological conditions contributing to resource scarcities, social breakdown, institutional failure, mass migrations and in turn cause greater political instability and conflict ([Brauch, 2002] and Pervis and Busby, 2004 Pervis, Nigel, Busby, Joshua, 2004. The Security Implications of Climate Change for the UN System. Environmental Change and Security Project Report 10, pp. 67–73.[Pervis and Busby, 2004]). In a report for the US Department of Defense, Schwartz and Randall (2003) speculate about the consequences of a worst-case climate change scenario arguing that water shortages will lead to aggressive wars (Schwartz and Randall, 2003, p. 15). Despite growing concern that climate change will lead to instability and violent conflict, the evidence base to substantiate the connections is thin ([Barnett and Adger, 2007] and [Kevane and Gray, 2008]).

#### War causes resource scarcity – not the other way around

Allouche 11 – fellow at the Institute of Development Studies at Brighton, UK (Jeremy, "The sustainability and resilience of global water and food systems: Political analysis of the interplay between security, resource scarcity, political systems and global trade" Food Policy, Volume 36, Supplement 1)

Armed conflict is the main cause of emergency food insecurity in the world today (FAO, 2000) and, hunger is routinely used as a weapon or a political tool during conflicts. In Ethiopia for example, the government attempted to deny food to rebel forces and their supporters – livestock, farms and food stores in Tigre and Eritrea were systematically bombed (Keller, 1992, p. 620). More generally, it has been estimated that approximately 24 million people in 28 countries across the world are hungry and in need of humanitarian assistance due to war (Messer et al., 2001). The most affected people are usually refugees and internally displaced persons of which women and children are a large majority. The impact of armed conflict on food production and food availability is important especially in the African context where most people earn at least a part of their livelihood through agriculture or livestock keeping. One study estimated that food production in 13 war-torn countries of Sub-Saharan Africa during 1970–1994 was on average 12.3% lower in war years compared to peace adjusted values (Messer et al., 1998). In another study covering all developing countries the FAO estimated that from 1970 to 1997 conflict induced losses of agricultural output totalled $121 billion in real terms (or an average of $4.3 billion annually) (FAO, 2000). These impacts are not just on food production but there is also a devastating human dimension in terms of hunger and malnutrition. So far the emphasis has been on the impacts of armed conflict on food security but there is also an important post-conflict dimension. A number of studies have shown how violent conflict in Africa plays a decisive role in the creation of conditions leading to famine ([De Waal, 1990], [De Waal, 1993] and [Macrae and Zwi, 1994]), and point to the changing nature of the relationship between conflict and vulnerability to famine. As highlighted by a recent FAO study (2008), food shortages linked to conflict set the stage for years of long-term food emergencies, continuing well after fighting has ceased. These situations can be characterized as chronic entitlement failures where communities, households and individuals who have had their assets stripped through conflict, lack the income and livelihood resources to access food and assure their food security, even where food is available (see Macrae and Zwi, 1994). The impact of war on water is also a serious issue. Ensuring safe water and decent sanitation for civilians in conflict zones is crucial in the sense that diseases have an even large impact in terms of mortality than military casualties during conflicts. The provision of water and sanitation is of utmost priority in post-conflict states. Unsafe water equates directly with poor health, but the lack of adequate public revenues, government capacity, and investor interest often results in failure to re-establish access to basic infrastructural services (Allouche, 2010). Overall, it seems clear that perceived resource scarcity is not an adequate explanation for war at the international level. At the national level, water and food insecurity are relatively important factors in the causes of civil wars. At the local level, water scarcity and food insecurity may lead to local political instability and sometimes violent forms of conflict. Armed conflict creates situation of emergency food and water insecurity and has a long-term impact on post-conflict societies. In the near future, it seems that despite climate change, international resource wars are unlikely and resource allocation will be settled through diplomatic negotiation and perhaps most importantly international trade as will be discussed in the next section.

#### No risk of resource wars

Pinker 11—Harvard College Professor, Johnstone Family Professor in the Department of Psychology at Harvard University (Steven, © 2011, The Better Angels of our Nature: Why Violence has Declined, RBatra)

Once again it seems to me that the appropriate response is “maybe, but maybe not.” Though climate change can cause plenty of misery and deserves to be mitigated for that reason alone, **it will not necessarily lead to armed conflict**. The political scientists who track war and peace, such as Halvard Buhaug, Idean Salehyan, Ole Theisen, and Nils Gleditsch, are skeptical of the popular idea that people fight wars over scarce resources.290 Hunger and resource shortages are tragically common in sub-Saharan countries such as Malawi, Zambia, and Tanzania, but wars involving them are not. Hurricanes, floods, droughts, and tsunamis (such as the disastrous one in the Indian Ocean in 2004) do not generally lead to armed conflict. The American dust bowl in the 1930s, to take another example, caused plenty of deprivation but no civil war. And while temperatures have been rising steadily in Africa during the past fifteen years, civil wars and war deaths have been falling. Pressures on access to land and water can certainly cause **local skirmishes, but a genuine war requires that hostile forces be organized and armed**, and that depends more on the influence of bad governments, closed economies, and militant ideologies than on the sheer availability of land and water. Certainly any connection to terrorism is in the imagination of the terror warriors: terrorists tend to be underemployed lower-middle-class men, not subsistence farmers.291 As for genocide, the Sudanese government finds it convenient to blame violence in Darfur on desertification, distracting the world from its own role in tolerating or encouraging the ethnic cleansing.

In a regression analysis on armed conflicts from 1980 to 1992, Theisen found that conflict was more likely if a country was poor, populous, politically unstable, and abundant in oil, but not if it had suffered from droughts, water shortages, or mild land degradation. (Severe land degradation did have a small effect.) Reviewing analyses that examined a large number (N) of countries **rather than cherry-picking one or two**, he concluded, “**Those who foresee doom, because of the relationship between resource scarcity and violent internal conflict, have very little support in the large-N literature**.” Salehyan adds that relatively inexpensive advances in water use and agricultural practices in the developing world can yield massive increases in productivity with a constant or even shrinking amount of land, and that better governance can mitigate the human costs of environmental damage, as it does in developed democracies. Since the state of the environment is at most one ingredient in a mixture that depends far more on political and social organization, resource wars are far from inevitable, even in a climate-changed world.

### 1nc Deforestation Impact Answers

#### Doesn’t cause significant species loss in forests and solves overpopulation.

Agarwal, 3Ranjan K. Agarwal. (University of Ottawa). "Forest Preservation of." 2003. <http://www.idebate.org/debatabase/topic_details.php?topicID=205>

**The environmental effects of deforestation are exaggerated** **and**, in any event, **are irrelevant** to developing countries. Some **scientists estimate that deforestation, if continued at its current pace, will only reduce species in tropical forests by 5-10% in the next 30 years.** For developing countries, there is the belief that rapid deforestation and rapid development are linked. Indonesia subsidizes its forest industry through export taxes. The revenue from commercial logging is substantial. Further, **in Brazil** and Indonesia, **there are programs promoting migration from heavily populated urban centres to deforested areas**. **Without this migration**, **Bali, Java and Brazil’s coastal areas would become unbearably overpopulated.**

#### Recent studies show that regeneration solves.

Elmqvist et. Al., 7

Thomas Elmqvist (Department of Systems Ecology at Stolkholm University). Markku Pyykonin. (Stockholm Resilience Centre) and Maria Tengo (Department of Biology and Plant Ecology at the University of Antananarivo). "Patterns of Loss and Regeneration of Tropical Dry Forest in Madagascar: The Social Institutional Context." Plos One. 2007. http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1853233

**Loss of tropical forests** and changes in land-use/land-cover **are of growing concern worldwide**. Although knowledge exists about the institutional context in which tropical forest loss is embedded, **little is known about the role of** social institutions in influencing **regeneration of tropical forests**. In the present study we used Landsat images from southern Madagascar from three different years (1984, 1993 and 2000) and covering 5500 km2, and made a time-series analysis of three distinct large-scale patterns: 1) loss of forest cover, 2) increased forest cover, and 3) stable forest cover. **Institutional characteristics** underlying these three patterns **were analyzed, testing the hypothesis that forest cover change is a function of strength** and enforcement **of local social institutions**. **The results showed a minor decrease of 7% total forest cover** in the study area **during** the whole period **1984–2000**, **but an overall net increase of 4% during the period 1993–2000**. The highest loss of forest cover occurred in a low human population density area with long distances to markets, while **a stable forest cover occurred in the area with highest population density and good market access**. Analyses of institutions revealed that loss of forest cover occurred mainly in areas characterized by insecure property rights, while areas with well-defined property rights showed either regenerating or stable forest cover. The results thus corroborate our hypothesis. **The large-scale spontaneous regeneration dominated by native endemic species appears to be a result of a combination of changes in precipitation, migration** and decreased human population and livestock grazing pressure, but **under conditions of maintained and well-defined property rights**. **Our study emphasizes the large capacity of a semi-arid system to spontaneously regenerate**, triggered by decreased pressures, but where existing social institutions mitigate other drivers of deforestation and alternative land-use.

### --- XT: Deforestation Impact Answers

#### Deforestation numbers are exaggerated – based on flawed studies.

**Ben-Ami, 6** Daniel Ben-Ami. "Deforestation exaggerated" Nov. 14. 2006. http://www.danielbenami.com/2006/11/deforestation-exaggerated.html

**An international team of researchers has found that the trend towards deforestation is not as bad a previously assumed**. The news is important as deforestation is one of the main sources of global greenhouse emissions (classified in the Stern report as part of “land use”). **An article on the BBC website says that the team used a new technique which measures timber volumes, biomass and captured carbon, rather than just land areas covered by trees**. Its findings will be published in the Proceedings of the National Academy of Sciences, an American journal: **“the researchers found that forest stocks had actually expanded over the past 15 years in 22 of the world's 50 most forested nations. “They also showed increases in biomass and carbon storage capacity in about half of the 50 countries.**

#### Those flawed studies informed flawed models – current rates are sustainable.

Due and Schroeder, 2kVigdis Broch Due and Richard A Schroeder. Producing Nature and Poverty in Africa. 2000. http://books.google.com/books?id=PUwYrkiKZzwC

Indeed, drawing together evidence from the two cases presented in this essay and the other countries we have studied (Fairhead and Leach 1998), we calculate that **deforestation** during the twentieth century **has been significantly exaggerated** across a large part of West Africa. As table 3 summarizes, **it may well be the only about a third of the figures used by international organizations and climatologists** such as Zheng and Eltahir (1997) cited at the beginning of this essay. Cassandra is using poor data for her predictions. It also seems likely that 1900-1920 was a high point in forest cover in several countries (certainly in Ghana and perhaps also in Cote D'Ivoire) following the decline of earlier farming populations. Forest loss might therefore appear as even less were it possible to take an earlier baseline. As each of the cases exemplifies in different ways, the history of West African forests is long, involving phases of peopling, management, depopulation, and the repopulation. Taylor's concern with European forest history is certainly pertinent to African conditions: The idea of great areas of primeval woodland, whose clearance in Saxon medieval and even later times which is such a feature of Professor Hoskins' work and is still repeated endlessly today, continues to mislead us. We shall never understand the history of the English landscape until we remove from our minds the concept of primeval woodland that our prehistoric ancestors had largely removed from the landscape by 1000 B.C. (Taylor 1988 in Hoskins 1955/1988:8). **Exaggerated claims of deforestation have misled ecologists.** They obscure how far present forest ecology **and** composition **may reflect less "nature and its degradation", than real histories of climatic fluctuations in interaction with past land management**. In West Africa in particular, claims of one-way deforestation have completely obscured what seems to have been a large increase in the area of the forest zone in recent centuries. **Exaggerated estimates of deforestation on this scale will also mislead regional and global climatic modeling**. **Exaggerated estimates** of deforestation have other, more nefarious consequences. They **obscure appreciation of how farmers may have been enriching and managing their landscapes in sustainable ways**. They obscure the historical experience of inhabitants and the origins of their claims to land. They obscure locality as it has been lived and is understood by those living it. And most significantly exaggerated rates of forest loss have often unjustly supported draconian environmental policies that further impoverish people in what is already a poor region.

#### No impact to forests

Lomborg 01 (Bjørn, director of the Copenhagen Consensus Center, Danish author, academic, “The Skeptical Environmentalist: Measuring the Real State of the World,” Cambridge University Press, originally published in Danish in 1998)

There are two primary reasons for viewing the tropical forests as a vital resource. In the 1970s we were told that rainforests were the lungs of the Earth. Even in July 2000, WWF argued for saving the Brazilian Amazon since “the Amazon region has been called the lungs of the world.” But this is a myth. True enough, plants produce oxygen by means of photosynthesis, but when they die and decompose, precisely the same amount of oxygen is consumed. Therefore, forests in equilibrium (where trees grow but old trees fall over, keeping the total biomass approximately constant) neither produce nor consume oxygen in net terms. Even if all plants, on land as well as at sea, were killed off and then decomposed, the process would consume less than 1 percent of the atmosphere’s oxygen.

The other argument in favor of preserving the forests is to conserve the globe’s profusion of species, or the biodiversity. We will look into this argument in chapter 23. In short it can be said that over the next 50 years we will not lose 50 percent of all species as claimed by many, but more like 0.7 percent. One cannot generally argue that these species constitute an actual economic resource (along the lines that they may constitute new and potentially vital medicines) but we may well hold moral reasons for their preservation. At the same time, numerous false impressions exist regarding the condition of our forests. Most people believe that over the last 50 years we have wiped out large swathes of rainforest, and perhaps temperate forest as well. Statements such as the one from the WWF quoted above naturally help to cement this idea. But as we have pointed out, there has not been a fall in global forest area during this period. On the other hand, Europe got rid of a large proportion of its forest by the end of the Middle Ages in order to make room for farming and bigger populations.

### 1nc Aquaculture Bad

#### Expanding offshore aquaculture increases food insecurity --- [net benefit land-based counterplan]

Food and Water Watch, 10 (June 2010, “Expansion of Factory Fish Farms in the Ocean May Lead to Food Insecurity in Developing Countries,” <http://documents.foodandwaterwatch.org/doc/FeedInsecurity.pdf>, JMP)

Conclusion: Development of Offshore Aquaculture in the United States will worsen food insecurity

Nearly one sixth of the world’s population is considered food insecure.27 Meanwhile, the current development of the open-ocean aquaculture industry in the United States could worsen food insecurity in developing countries by placing an increased demand on an already dwindling prey fish population. Furthermore, ocean fish farming in the United States does not equal more food security for most U.S. consumers either. As it is, the United States exports over 70 percent of its seafood to the European Union and Japan, which have higher standards for seafood and are willing to pay more for fish produced with more stringent environmental, health and labor regulations. Unless trade patterns change, which is highly unlikely under current regulatory conditions, most fish farmed offshore in the United States would likely be shipped abroad, leaving the United States with only the ecological problems. Already, Kona Kampachi®, a farmed fish from Hawaii, is sold for $17 per pound — far out of the price range of the average U.S. consumer.28 Expanding U.S. offshore aquaculture simply means more high-end fish available for those who can afford it.

Offshore aquaculture will not significantly increase the supply of quality seafood to U.S. consumers, and products will certainly not make their way to developing countries. Further, using wild fish to feed farmed fish is an unsustainable practice that depletes forage fish populations, threatens the food security of many people in developing countries, and takes a valuable food source away from people who need it.

Policy Recommendations:

Do not support legislation that will open U.S. waters to offshore aquaculture.

Support an alternative form of aquaculture, recirculating land-based systems, with fish species that do not require wild fish in their feed.

Encourage more U.S. seafood to be consumed domestically and increase inspections of imported seafood, thus decreasing the global seafood trade to a level that will cause less negative ramifications on global food security.

#### Expansion of marine aquaculture undermines ocean ecosystem and wild fisheries several ways

Naylor, 6 --- Fellow at the Center for Environmental Science and Policy, Stanford University (Spring 2006, Rosamond L., “Environmental Safeguards for Open-Ocean Aquaculture,” <http://issues.org/22-3/naylor/>, JMP)

Opening far-offshore waters to aquaculture could lead to substantial commercial benefits, but it also poses significant ecological risks to the ocean—a place many U.S. citizens consider to be our last frontier.

Some of the species now farmed in open-ocean cages, such as bluefin tuna, Atlantic cod, and Atlantic halibut, are becoming increasingly depleted in the wild. Proponents of offshore aquaculture often claim that the expansion of farming into federal waters far from shore will help protect or even revive wild populations. However, there are serious ecological risks associated with farming fish in marine waters that could make this claim untenable. The ecological effects of marine aquaculture have been well documented, particularly for near-shore systems, and are summarized in the 2005 volumes of the Annual Review of Environment and Resources, Frontiers in Ecology (February), and BioScience (May). They include the escape of farmed fish from ocean cages, which can have detrimental effects on wild fish populations through competition and interbreeding; the spread of parasites and diseases between wild and farmed fish; nutrient and chemical effluent discharge from farms, which pollutes the marine environment; and the use of wild pelagic fish for feeds, which can diminish or deplete the low end of the marine food web in certain locations.

Because offshore aquaculture is still largely in the experimental phase, its ecological effects have not been widely documented, yet the potential risks are clear. The most obvious ecological risk of offshore aquaculture results from its use of wild fish in feeds, because most of the species being raised in open-ocean systems are carnivorous. If offshore aquaculture continues to focus on the production of species that require substantial quantities of wild fish for feed—a likely scenario because many carnivorous fish command high market prices—the food web effects on ecosystems that are vastly separated in space could be significant.

#### Aquaculture increases overfishing --- doesn’t solve food security

McCutcheon, 14 (3/27/2014, Jody, “Something Fishy? Aquaculture and the Environment,” <http://eluxemagazine.com/magazine/theres-something-fishy-aquaculture/>, JMP)

What We’ve Learned

In a nutshell:

–Farmed fish isn’t as healthy as wild, and doesn’t deliver as many nutrients either

–There’s a danger of farmed or even genetically modified fish escaping into the wild and contaminating wild stock

–Farms don’t solve issues of increased demand. The Jevons Paradox states that as production methods grow more efficient, demand for resources actually increases – so as aquaculture makes fish production increasingly efficient, and fish become more widely available and less expensive, demand increases across the board. This drives more fishing, which hurts wild populations. Thus, despite what fish farmers claim, fish farming cranks up the pressure on already-depleted populations of wild fish around the world.

#### Risks disease spread --- collapses the industry

Howell, et. al, 14 --- PhD, Project Director of Report and Research Director for Future of Fish (1/15/2014, Colleen, Future of Fish, “Breakthrough Aquaculture: Uncovering solutions that drive ecologically sound and commercially viable models for farm-raised seafood,” <http://www.futureoffish.org/sites/default/files/docs/resources/Aquaculture_Report_FoF_2014.pdf>, JMP)

Disease In any production system where water is exchanged between the farm and the natural environment, there is a risk that the water carries pathogens, viruses, or parasites harmful to wild populations. In the case of net pens and cages, farmed fish can acquire disease and parasites from the environment and amplify a pathogen that already exists. Aquaculture is also a means of introducing new pathogens to a region through the global transport of eggs. Disease and parasites can also spread from farm to farm, and some farmed fish industries have experienced crashes due to disease. There is risk of major outbreaks if adequate biosecurity planning is not in place.

### --- Uniqueness --- Global Aquaculture Slowing

#### Global aquaculture growth slowing

Klinger & Naylor, 12 --- \*Ph.D. student in Stanford's Emmett Interdisciplinary Program in Environmental and Resources, AND \*\*professor of environmental Earth system science at Stanford (Dane & Rosamond, “Searching for Solutions in Aquaculture: Charting a Sustainable Course,” <http://woods.stanford.edu/sites/default/files/files/searching%20for%20solutions%20in%20aquaculture.pdf>, JMP)

Solutions, Opportunities, and Limitations to Growth

Despite rapid increases in recent decades, growth in global aquaculture production may be slowing (3). Natural resource limitations and negative environmental impacts are two of the most significant impediments to continued growth in the aquaculture sector (21). There is a global trend toward intensification of farming systems as competition for land and water resources increases; this trend is particularly apparent in China and other Asian countries facing rapid economic growth, high population densities, and limited resource supplies. Life-cycle assessments of aquaculture production indicate higher energy dependency and greater environmental stress with high rates of intensification (48–50).

### --- XT: Expansion Magnifies Risks

#### Massive expansion of marine aquaculture has significant ecological risks

Naylor, 6 --- Fellow at the Center for Environmental Science and Policy, Stanford University (Spring 2006, Rosamond L., “Environmental Safeguards for Open-Ocean Aquaculture,” <http://issues.org/22-3/naylor/>, JMP)

An essential question in the debate thus remains: What is the vision of the Department of Commerce in developing offshore aquaculture? If the vision is to expand offshore production to a scale sufficient to eliminate the $8 billion seafood deficit, the ecological risks will be extremely high.

#### Scaling up aquaculture will magnify environmental harms

Strasser, 14 --- Senior Editor of ThinkProgress (4/21/2014, Annie-Rose, “The New, Innovative And More Efficient Way Of Feeding People,” <http://thinkprogress.org/climate/2014/04/21/3422486/big-ag-takes-to-the-ocean/>, JMP)

There are complications and concerns with scaling up aquaculture, however. In some ways, it’s just like agriculture: Big Ag may supply us with affordable food, but that can be done by cutting corners or taking a serious toll on the environment. The same could be true for what’s happening in fish farming now, and some of the same big players are even involved in the industry. Christy Walton, the billionaire of WalMart fame, is deeply involved in the aquaculture game, pouring money into a group called Cuna Del Mar, where her son works, that invests in aquaculture projects around the globe. Peter Drucker, a famous management consultant credited with helping to invent the modern corporation, once said, “Aquaculture, not the Internet, represents the most promising investment opportunity of the 21st century.”

### --- XT: Laundry List Turn

#### Aquaculture causes disease spread, overfishing and pollution that collapses marine ecosystems

McCutcheon, 14 (3/27/2014, Jody, “Something Fishy? Aquaculture and the Environment,” <http://eluxemagazine.com/magazine/theres-something-fishy-aquaculture/>)

**\*\*\*Note --- FCR = Feed Conversion Ratio**

And while farmed fish don’t contain high levels of ocean pollutants like many wild fish do—especially those living in industrial areas like North America’s Great Lakes—they almost always do contain various antibiotics, hormones and pesticides used in the farming process. Plus, farmed fish are usually crowded into their pens or ponds, creating fertile breeding grounds for diseases like infectious salmon anemia and parasites like sea lice—hence the use of antibiotics and pesticides.

Food Industry Lies

Impassive and duplicitous, the industrial agricultural that’s raping the planet’s land has now infiltrated our oceans. If aquaculture’s primary purpose is, as they claim, to relieve pressure on the world’s wild fisheries, then why are wild stocks being depleted to feed farmed fish?

Farmed Atlantic salmon may have an ideal FCR of 1:1 (or thereabouts), but that just means it takes one pound of wild fish to produce one pound of farmed salmon. Yes, high-protein fishmeal is made of wild, low-on-the-food-chain, pelagic (open-ocean) fish. As much as 4.5 kilograms of pelagic fish go into a single kilogram of fishmeal. For fish with higher FCR’s, the whole skewed dynamic of feeding farmed fish with wild represents a constant overdraft on the ocean bank. This practice steals essential food sources from higher-on-the-food-chain marine life, which further skews the ecosystem. Overall, about 37% of the global seafood catch is used for feed, up from a mere 7.7% back in 1948. Under current trends, demand for fishmeal will exceed supply by around 2050.

In addition, although aquaculturalists claim the contamination of their farms is contained within their ponds, the truth is that industrial scale aquaculture destroys coastal habitats when waste, disease, antibiotics and pests are flushed out of farming ponds into local waters, where they infiltrate wild populations. In fact, waste from fish farms can oversaturate coastal waters with nutrients, creating dead zones that suffocate marine life. A poorly run farm of 200,000 salmon can pollute the coastal environment with amounts of nitrogen and phosphorus similar to that in the sewage of a town of 20,000. Even more alarming, the antibiotics being released are creating antibiotic-resistant pathogens that wreak havoc on farmed and wild fishery stocks alike.

Another concern is the potential escape into local waters of exotic, possibly genetically modified species that may eventually replace indigenous species. Massachussetts-based company AquaBounty, for example, is bioengineering fish to grow faster, an advantage that would help them outcompete fellow fish. But according to Time magazine, it is very easy and common for farmed fish to escape into the wild, thus just one GMO fish could do irreparable damage to a species.

#### Aquaculture has a number of environmental problems that undercuts sustainability

Sielen, 13 --- Senior Fellow for International Environmental Policy at the Center for Marine Biodiversity and Conservation at the Scripps Institution of Oceanography (Nov/Dec 2013, Alan B., Foreign Affairs, “The Devolution of the Seas: The Consequences of Oceanic Destruction,” <http://www.foreignaffairs.com/articles/140164/alan-b-sielen/the-devolution-of-the-seas>, JMP)

As the oceans decline and the demand for their products rises, marine and freshwater aquaculture may look like a tempting solution. After all, since we raise livestock on land for food, why not farm fish at sea? Fish farming is growing faster than any other form of food production, and today, the majority of commercially sold fish in the world and half of U.S. seafood imports come from aquaculture. Done right, fish farming can be environmentally acceptable. But the impact of aquaculture varies widely depending on the species raised, methods used, and location, and several factors make healthy and sustainable production difficult. Many farmed fish rely heavily on processed wild fish for food, which eliminates the fish-conservation benefits of aquaculture. Farmed fish can also escape into rivers and oceans and endanger wild populations by transmitting diseases or parasites or by competing with native species for feeding and spawning grounds. Open-net pens also pollute, sending fish waste, pesticides, antibiotics, uneaten food, diseases, and parasites flowing directly into the surrounding waters.

### --- XT: Overfishing Turn

#### Aquaculture won’t solve overfishing

Pauly, 9 --- professor at the Fisheries Centre of the University of British Columbia (9/28/2009, Daniel, “Aquacalypse Now,” <http://www.newrepublic.com/article/environment-energy/aquacalypse-now>, JMP)

Some Pollyannas believe that aquaculture, or fish farming, can ensure the health of stocks without government action--a notion supposedly buttressed by FAO statistics showing such rapid growth in aquaculture that more than 40 percent of all “seafood” consumed now comes from farms. The problem with this argument is that China reports about 68 percent of the world’s aquaculture production, and the FAO, which has been burned by inflated Chinese statistics before, expresses doubt about its stated production and growth rates. Outside of China--where most farmed fish are freshwater vegetarians, such as carp--aquaculture produces predominately carnivorous marine fish, like salmon, which are fed not only vegetal ingredients, but also fishmeal and fish oil, which are obtained by grinding up herring, mackerel, and sardines caught by “reduction fisheries.” Carnivore farming, which requires three to four pounds of smaller fish to produce one pound of a larger one, thus robs Peter to pay Paul. Aquaculture in the West produces a luxury product in global terms. To expect aquaculture to ensure that fish remain available--or, at least, to expect carnivore farming to solve the problem posed by diminishing catches from fisheries--would be akin to expecting that Enzo Ferrari’s cars can solve gridlock in Los Angeles.

#### Aquaculture undermines small scale aquaculture and traditional fishers and increases unemployment in developing countries

Food and Water Watch, 10 (June 2010, “Expansion of Factory Fish Farms in the Ocean May Lead to Food Insecurity in Developing Countries,” <http://documents.foodandwaterwatch.org/doc/FeedInsecurity.pdf>, JMP)

Factory Fish Farming Threatens Livelihoods

Larger corporations are increasingly automating the operations at their aquaculture sites, reducing labor needs and boosting profits.12 This trend threatens small-scale aquaculture, which has traditionally been a successful way for people in developing countries to improve their standard of living.13 Unfortunately, large factory fish farms are unlikely to create a significant number of valuable, local jobs. For instance, in Norway, farmed salmon production doubled in a six-year period while employment decreased by four percent.14 Furthermore, flooding the market with farmed fish drives down the price of wild fish, threatening the livelihoods of traditional fishermen.15 Fishermen and women who are willing to switch to aquaculture face obstacles such as skill transfer issues, lack of employment opportunity and safety issues.16 In Hawaii, four safety-related lawsuits are pending against a single aquaculture company.17 It may be much more difficult for injured employees to seek retribution in developing countries that have fewer regulations in place to protect laborers.

### --- AT: Not Using Fish for Feed \*\*\*

#### Smaller fish still being used for feed --- depletes fish populations and alternatives also wreck the environment

Klinger & Naylor, 12 --- \*Ph.D. student in Stanford's Emmett Interdisciplinary Program in Environmental and Resources, AND \*\*professor of environmental Earth system science at Stanford (Dane & Rosamond, “Searching for Solutions in Aquaculture: Charting a Sustainable Course,” <http://woods.stanford.edu/sites/default/files/files/searching%20for%20solutions%20in%20aquaculture.pdf>, JMP)

**\*\*\*Note --- FM = Fish Meal / FO = Fish Oil**

FEED STRATEGIES

The efficiency of feed use and the sourcing of feed inputs for aquaculture are among the most important factors determining the economic profitability and environmental impacts of fish farming (41, 139–144). In particular, the use of wild fish in the form of FM and FO as inputs into aquaculture feeds relies on marine species that are renewable but often overexploited for human use. If aquaculture activities consume a greater volume of fish in feeds than they ultimately produce in the final product, they cannot be considered sustainable (41, 143). Not all farmed seafood falls into this category: Aquatic plant production and the culture of bivalve mollusks and some fish (e.g., certain carp species) extract ambient nutrients and planktonic food organisms from the water column and can thus be considered sustainable from a feeds perspective. Aquaculture systems that rely on FM, FO, or whole fish (e.g., tuna ranching) can use (to varying degrees) terrestrial plant- and animal-based proteins and lipids as substitutes, but other environmental issues arise. For example, the production of terrestrial feed ingredients can be associated with high nutrient and chemical input use and loss, land clearing in sensitive environments such as the Amazon, high energy-dependency ratios, and greenhouse gas emissions (144, 145). In short, as in all animal production systems, there is no free lunch regarding feeds for carnivorous and omnivorous fish, crustaceans, and other cultured aquatic animals such as turtles.

On the whole, the aquaculture sector has achieved significant progress in feed efficiency and feed inputs in recent decades. The ratio of wild fish input to total farmed-fish output (fish in to fish out) has fallen well below 1.0, feed conversion ratios have improved, and FM and FO inclusion rates in feeds have been reduced throughout the aquaculture industry (139, 141, 146). Yet with continued growth in the total volume of farmed fish and crustaceans, the shares of global FM and FO consumed by aquaculture (as opposed to livestock and other industrial uses) were estimated at 60% and 74%, respectively, in 2008—roughly twice the shares that aquaculture consumed a decade earlier (141). Moreover, the proportion of omnivorous aquaculture species raised on diets with some inclusion of FM increased over this period, and FO has remained an important ingredient in aquafeeds for several carnivorous species to maintain fish health and provide long-chain (LC) omega-3 health benefits for consumers (139).

The aquaculture industry is now facing increasing competition for FO by humans consuming FO tablets and companies manufacturing pharmaceutical grade products with considerably higher levels of LC omega-3 fatty acids than have been used in the past. This competition is driving up prices for FO and hurting profits for certain segments of the aquaculture industry (particularly salmon and marine finfish), but also inducing more substitution in feed ingredients. The intersecting dynamics of the pharmaceutical, food supplement, and aquafeed industries is leading to a reversal in the share of global FO consumed by the aquaculture industry from a peak of over 80% in 2007, yet aquaculture still dominates global FO demand (141).

Some key questions loom regarding the ecological and economic sustainability of the aquaculture industry with respect to feeds. Will the demand for FM and FO for feeds, pharmaceutical products, and food supplements deplete wild fishery resources over time? If so, how will the decline affect humans and marine organisms that depend on fish for food? And how will those ecological effects translate to economic impact on different segments of the aquaculture industry?

Global FM and FO production has fluctuated between 5–7 mmt and 0.8–1.2 mmt per year, respectively, over the past few decades, with variations driven mainly by climate variability related to El Ni˜ no-Southern Oscillation events and their impacts on forage fish stock abundance (143, 147). Between 20 to 30 mmt of reduction fish (one-quarter to one-third of the global fish catch) are removed from the marine food web each year to produce FM and FO (1). These fish are generally low on the marine food chain (LTL) and include small pelagic fish species, such as the Peruvian and Japanese anchovy, blue whiting, Atlantic herring, and chub and Chilean jack mackerel (147). An estimated additional 5–9 mmt (with a mean of 7.2 mmt) of low-value “trash fish” and other small pelagic fish are used in nonpelleted (farmmade) aquafeeds (148). These fish are also a key constituent of diets for low-income households in many parts of the world.

In natural systems, forage fish play an important role in converting plankton into food for higher TL species, including humans, larger fish, marine mammals, and seabirds. Although LTL fish are often characterized as fast-growing and resilient, analyses of stock assessment and global landings data for hundreds of species show that up to twice as many fisheries for small, LTL species have collapsed during the past half-century than for higher TL predators in the oceans (149). This result reflects high catch limits for LTL fish set by fisheries managers irrespective of large population fluctuations caused by climate variability (El Ni˜ no-Southern Oscillation events) and overfishing as fisheries managers often assume. Even temporary collapses can have widespread ecosystem effect (149). On the basis of ecosystem model results, Smith et al. (150) suggest that LTL catch volumes have to be reduced by 20% to protect higher trophic marine species in most regions. Today, most forage fish populations are either fully exploited, overexploited, or recovering from overexploitation (40). Addressing the threat of overexploitation of wild fisheries for reduction thus requires a focus on improving feed efficiencies and on replacing FM, FO, and other nonsustainable fish inputs (such as trash fish) in aquaculture diets (139, 143, 151, 152).

#### Aquaculture driving growing demand for fishmeal and fish oil

ENS, 11 (6/13/2009, Environmental News Service, “Obama Administration Promotes Aquaculture in U.S. Waters,” <http://ens-newswire.com/2011/06/13/obama-administration-promotes-aquaculture-in-u-s-waters/>, JMP)

But the farming of fish that eat other fish, like salmon, does not help. Numerous studies have shown that salmon farming has negative impacts on wild salmon, as well as the forage fish that need to be caught to feed them.

Aquaculture can be more environmentally damaging than wild fisheries on a local basis. Concerns include waste handling, side-effects of antibiotics, competition between farmed and wild animals, and using other fish to feed more marketable carnivorous fish.

To maximize growth and enhance flavor, aquaculture farms use large quantities of fishmeal and fish oil made from less valuable wild-caught species, including anchoveta and sardine.

In 2009, aquaculture for the first time supplied half of the total fish and shellfish for human consumption,

“Aquaculture’s share of global fishmeal and fish oil consumption more than doubled over the past decade to 68 percent and 88 percent, respectively,” wrote Rosamond Naylor, a professor of environmental Earth system science at Stanford University and director of the Stanford Program on Food Security and the Environment in a 2009 study published in the Proceedings of the National Academy of Sciences.

“The huge expansion is being driven by demand,” wrote Naylor. “As long as we are a health-conscious population trying to get our most healthy oils from fish, we are going to be demanding more of aquaculture and putting a lot of pressure on marine fisheries to meet that need.”

### --- XT: Food Insecurity Turn

#### Increased use of prey fish for aquaculture feed undercuts marine food web and causes food insecurity in developing countries

Food and Water Watch, 10 (June 2010, “Expansion of Factory Fish Farms in the Ocean May Lead to Food Insecurity in Developing Countries,” <http://documents.foodandwaterwatch.org/doc/FeedInsecurity.pdf>, JMP)

Ocean-farmed fish are fed pellets that contain wild fish, lipids and cellulose, among other ingredients.2 The wild fish are mostly converted to the fishmeal and fish oil that make up approximately 40 percent of the pellets fed to farmed fish.3 In 2006, the aquaculture sector alone consumed nearly 90 percent of small “pelagic” fish captured worldwide.4 This category of fish, which larger fish, marine mammals, birds and people alike depend on for food, includes anchovies, herring, mackerel, sardines and more. Turning these fish into aquaculture feed is a questionable use of resources, because many developing countries rely on these types of fish to feed people and provide employment in traditional fisheries.

Factory Fish Farming Hurts the World’s Hungry

Aquaculture promoters claim that factory fish farming will help feed developing countries in two ways. First, they claim that more fish farming should equal more fish to eat. A Web site for the global aquaculture industry stated: “Declining wild fish stocks has limited the annual catch to 90 million tonnes. In response aquaculture has risen to fill this gap.”5 The second argument is that aquaculture will create more jobs, creating wealth and allowing people to buy more food. According to the Food and Agriculture Organization of the United Nations, “Beyond its direct role in the fight against hunger, aquaculture can also indirectly improve food security by reducing poverty, providing jobs and boosting foreign exchange earnings in the developing world.”6 In the United States, NOAA mimics this thinking, claiming that U.S. aquaculture will “meet the growing demand for safe, healthy seafood, create jobs for U.S. coastal communities, increase regional food supply and security, and help restore depleted commercial and recreational marine species.”7 Unfortunately, over consumption of small prey fish, along with environmental and social ramifications, make factory fish farming a detriment rather than a help to food security.

Source of Direct Food

The nutritional profile of small prey fish is extensive, and plays a key role in promoting the health of people in developing countries. These fish contain essential vitamins and minerals, co-enzymes, and fatty acids, all beneficial for optimal health.8 Additionally, because these food fish are often eaten whole, people benefit from the bones, which are a significant source of calcium.9 These fish are not only a rich source of nutrients, but also a primary source of protein for many people in developing countries. Food fish contribute more than 25 percent of the total animal protein supply for approximately one billion people (one sixth of the world’s population) in 58 countries.10 While development of offshore aquaculture in the United States may supply more seafood to consumers in Europe and Japan, places where much of the United States’ seafood is already exported, it will likely decrease supply to populations that are much more dependent on fish for nutrition.

Although forage fish are sometimes thought of as a lowvalue commodity, more and more consumers in the United States and abroad are recognizing the value of eating “lower on the food chain” and returning to species like sardines and anchovies, long valued in Italian and other regional cuisines. Marine biologist Dr. Daniel Pauly has pointed out the mistake of labeling these fish as “low” in value: “We should never have followed the fish meal industry on the slippery slope of naming edible fish ‘forage fish’ in the first place. These fish could provide humans with large quantities of protein, but we waste them by using them as raw material for fish meal.”11

#### Export of prey fish for aquaculture increases food insecurity in developing countries

Food and Water Watch, 10 (June 2010, “Expansion of Factory Fish Farms in the Ocean May Lead to Food Insecurity in Developing Countries,” <http://documents.foodandwaterwatch.org/doc/FeedInsecurity.pdf>, JMP)

Export Model: The Cobbler’s Children Have No Shoes

Exporting food often means the local population suffers from food insecurity, because of a competitive market rather than an actual food shortage. Nine of the top 40 fish-exporting nations are qualified as low-income food deficit countries (known as LIFDCs).22 LIFDCs are encouraged to export food in exchange for money to buy cheaper food. However, they are often left vulnerable to the fluctuations of the global market, which can result in being unable to afford nutritious food with the money earned from their goods. Statistics from the Food and Agriculture Organization of the United Nations show that fish exports from LIFDCs only cover half of the cost of food imports.23 Furthermore, a recent study found no demonstrable correlation between fish trade and well-being indicators in sub-Saharan Africa.24 If forage fish were used to feed the local population, a country could be more food secure. In Africa, for example, there is enough fishmeal to reduce the protein shortage of the continent by 50 percent.25 In Indonesia, half of the children of fishing families are stunted, and in India, the infant mortality in fishing villages is relatively high, while both of these countries are leading exporters of fish and fish products.26 This export model takes an accessible, nutrient-rich food source from developing countries and feeds it to fish and other animals that will be consumed by people in developed countries, creating malnutrition in some of the very areas where the fish are plentiful. Aquaculture consumption of small forage fish essentially takes them from the poor to feed the rich.

#### Also increases market price of prey fish which exacerbates food insecurity

Food and Water Watch, 10 (June 2010, “Expansion of Factory Fish Farms in the Ocean May Lead to Food Insecurity in Developing Countries,” <http://documents.foodandwaterwatch.org/doc/FeedInsecurity.pdf>, JMP)

Price Increases

Given the importance of prey fish in people’s diets, (as well as for wildlife like larger fish, marine mammals and birds), it is problematic for people to compete with the global aquaculture industry for access to this resource. The increasing demand for fish feed by the aquaculture industry has increased the market price of prey fish, driving prices up and out of reach for people in countries where these fish, until recently, were a critical and typical part of their diet. Increasingly, these fish are being diverted to feed carnivorous farmed fish (such as salmon), pigs, poultry and pets in high-income countries.18 Since the late 1970s, per-capita fish supply declined by 3 percent in Africa and 8 percent in South America while consumption of fish increased starkly by 28 percent in North and Central America during the same decade.19 The increase in aquaculture since these statistics were published has only exacerbated the decline of availabile fish in lower-income countries. Availability of prey fish in sub-Saharan Africa, for example, is expected to fall even further by 2020, even while production of fish for export (both wild-caught and farmed) is increasing.20 Meanwhile, the United States imports twice as much fish just to feed livestock as do all the low-income countries combined.21

### --- XT: Fish Escapes Turn

#### Escapes will undermine ecosystems and wild fish stocks

Howell, et. al, 14 --- PhD, Project Director of Report and Research Director for Future of Fish (1/15/2014, Colleen, Future of Fish, “Breakthrough Aquaculture: Uncovering solutions that drive ecologically sound and commercially viable models for farm-raised seafood,” <http://www.futureoffish.org/sites/default/files/docs/resources/Aquaculture_Report_FoF_2014.pdf>, JMP)

Escapees Farmed species that escape into open streams, lakes, or oceans can compete with naturally occurring organisms for food and habitat, disrupt the ecosystem balance, or contaminate the gene pool of wild stocks of the same species.

#### Fish escapes are more likely as aquaculture expands offshore --- wrecks wild fisheries

Naylor, 6 --- Fellow at the Center for Environmental Science and Policy, Stanford University (Spring 2006, Rosamond L., “Environmental Safeguards for Open-Ocean Aquaculture,” <http://issues.org/22-3/naylor/>, JMP)

In addition, although producers have an incentive to use escape-proof cages, escapes are nonetheless likely to occur as the offshore industry develops commercially. The risks of large-scale escapes are high if cages are located in areas, such as the Gulf of Mexico, that are prone to severe storms capable of destroying oil rigs and other sizeable marine structures. Even without storms, escapes frequently occur. In offshore fish cages in the Bahamas and Hawaii, sharks have torn open cages, letting many fish escape. In addition, farming certain species can lead to large-scale “escapes” from fertilization. For example, cod produce fertilized eggs in ocean enclosures, and although ocean cages are more secure than near-shore net pens, neither pens nor cages will contain fish eggs. The effects of such events on native species could be large, regardless of whether the farmed fish are within or outside of their native range. At least two of the candidate species in the Gulf of Mexico (red drum and red snapper), as well as cod in the North Atlantic, have distinct subpopulations. Escapes of these farmed fish could therefore lead to genetic dilution of wild populations, as wild and farmed fish interbreed.

### --- XT: Disease Turn

#### Large scale expansion of marine aquaculture will cause spread of diseases and parasites

Naylor, 6 --- Fellow at the Center for Environmental Science and Policy, Stanford University (Spring 2006, Rosamond L., “Environmental Safeguards for Open-Ocean Aquaculture,” <http://issues.org/22-3/naylor/>, JMP)

The main problem with the proposed legislation is the broad discretion given to the secretary of Commerce to promote offshore aquaculture without clear legal standards for environmental protection.

Offshore aquaculture also poses a risk of pathogen and parasite transmission, although there is currently little evidence for disease problems in offshore cages. In general, however, large-scale intensive aquaculture provides opportunities for the emergence of an expanding array of diseases. It removes fish from their natural environment, exposes them to pathogens that they may not naturally encounter, imposes stresses that compromise their ability to resist infection, and provides ideal conditions for the rapid transmission of infectious agents. In addition, the production of high-valued fish often involves trade in live aquatic animals for bait, brood stock, milt, and other breeding and production purposes, which inevitably results in trans-boundary spread of disease. The implications of open-ocean farming for pathogen transmission between farmed and wild organisms thus remains a large and unanswered question. Moreover, pathogen transmission in the oceans is likely to shift in unpredictable ways in response to other human influences, particularly climate change.

#### Massive expansion of aquaculture will undermine any dilution benefits

Naylor, 6 --- Fellow at the Center for Environmental Science and Policy, Stanford University (Spring 2006, Rosamond L., “Environmental Safeguards for Open-Ocean Aquaculture,” <http://issues.org/22-3/naylor/>, JMP)

Even the claim that open-ocean aquaculture provides “a dilution solution” to effluent discharge may be disputed as the scale of aquaculture operations expands to meet economic profitability criteria. The ability of offshore aquaculture to reduce nutrient pollution and benthic effects will depend on flushing rates and patterns, the depth of cage submersion, the scale and intensity of the farming operations, and the feed efficiency for species under cultivation. Scientific results from an experimental offshore system in New Hampshire indicate no sedimentation or other benthic effects, even when the cages are stocked with more than 30,000 fish. However, commercial farms will likely have 10 or more times this density in order to be economically viable; commercial salmon farms commonly stock 500,000 to a million fish at a site. It is not a stretch to imagine a pattern similar to that of the U.S. industrial livestock sector, with large animal operations concentrated near processing facilities and transportation infrastructure, and in states with more lenient environmental standards.

### --- AT: Plan Solves Turns (Ensures Environmental Protection)

#### Large-scale operations will dominate offshore --- they have not been evaluated for environmental benefits

Klinger & Naylor, 12 --- \*Ph.D. student in Stanford's Emmett Interdisciplinary Program in Environmental and Resources, AND \*\*professor of environmental Earth system science at Stanford (Dane & Rosamond, “Searching for Solutions in Aquaculture: Charting a Sustainable Course,” <http://woods.stanford.edu/sites/default/files/files/searching%20for%20solutions%20in%20aquaculture.pdf>, JMP)

Offshore systems fail to fully resolve many of the environmental concerns associated with conventional coastal systems, including the risk of escaped fish interbreeding or competing for resources with wild fish, aggregation of other animals around offshore structures, and disease and parasite transmission to wild fish (reviewed in References 122 and 128). These problems, and the effects of releasing even diluted quantities of uneaten feed, wastes, and therapeutants, are likely to be reduced when farms move away from the coast and into oligotrophic environments, but to an uncertain degree (128). Although offshore seaweed and shellfish operations do not require feed (7, 123), resource efficiency remains an issue with offshore finfish operations because the high cost of building and operating offshore currently favors production of high-value carnivorous fish (11, 128). The high cost of production is also likely to rely on economies of scale for profitability, and thus favor large-scale operations or suites of operations that have not been evaluated for their impacts on marine ecosystems. Moving offshore increases the distances that support vessels must travel to reach aquaculture farms and therefore increases the fuel use and carbon intensity of production. Finally, the cost of labor may increase as managing offshore vessels and equipment requires skilled employees.

#### Environmentalists have opposed all bills to increase aquaculture because of risks

\*\*\*Note --- the plan essentially passes the National Sustainable Offshore Aquaculture Act (explained in 1ac Johns, 13 ev)

Madin, 11 (9/21/2011, Kate, “Where Will We Get Our Seafood? Unlike the rest of the world, the U.S. has not embraced aquaculture,” <http://www.whoi.edu/oceanus/feature/where-will-we-get-our-seafood>, JMP)

The U.S. could provide most of the seafood its population needs via aquaculture, he said, but a host of economic, environmental, health, and policy issues has muddied the waters. The fishing industry has economic concerns about retaining jobs in traditional commercial fishing; and there are uncertainties about regulations governing aquaculture, especially in federal waters. And while conservationists fight to protect overfished fisheries and endangered species, they also have ecological concerns about fish farms and about antibiotics, chemicals, and feeds used to raise fish.

“For a number of years, bills have been introduced in Congress to set up a streamlined permitting mechanism to facilitate aquaculture in federal waters, but those bills have never gone anywhere, mainly because of opposition from fishing communities and environmental groups,” Kite-Powell said. “Seafood consumption is rising more quickly abroad than it is here in the United States. Should we take active steps to prepare for a future when international supplies may not be as readily available as they currently are?”

#### ( ) environmental lobby opposes the National Sustainable Offshore Aquaculture Act

Richardson, 11 (12/1/2011, White, “Fishing for a future, part 2 | Facing mounting costs and restricted access, Maine fishermen find new opportunities in a growing aquaculture industry,” <http://www.mainebiz.biz/article/20100208/CURRENTEDITION/302089998/fishing-for-a-future-part-2-|-facing-mounting-costs-and-restricted-access-maine-fishermen-find-new-opportunities-in-a-growing-aquaculture-industry>, JMP)

Stalled regulations hamper domestic growth

Market conditions are ripe for an enhanced American aquaculture industry. The U.S. imports 81% of its seafood, creating a $9.4 billion trade deficit, the third largest behind oil and automobiles. In 2007, the U.S. aquaculture industry produced roughly 530,000 metric tons, placing it 14th in the world.

Despite a 1980 National Aquaculture Act to encourage the growth of domestic aquaculture, a federal regulatory framework to achieve that goal remains elusive. In late December, California Rep. Lois Capps introduced the National Sustainable Offshore Aquaculture Act of 2009 to set up a regulatory framework for permitting offshore fish farms in federal waters, which extend from three miles to 200 miles off the coast. States like Maine have a process to permit fish farms in state waters, but as space becomes limited in near-shore areas, the industry is looking to the open ocean for expansion.

The bill, H.R. 4363, follows several failed attempts at a national law. The Offshore Aquaculture Act of 2007, for example, never made it out of committee. Michael Rubino, manager of National Oceanic and Atmospheric Administration's aquaculture program, says it's not vehement opposition to the idea of offshore aquaculture that keeps tying up the legislation, just a simple lack of time. "The main thing is Congress has a lot on its plate," Rubino says. "It's tough to get any legislation passed."

There's not much hope this current bill will fare any better than its predecessors. Both sides - the environmental lobby and the aquaculture industry - have problems with it, according to advocates for each.

### --- AT: Laws Ensure Environmental Protection

#### Current federal laws are not sufficient to protect the environment

Naylor, 6 --- Fellow at the Center for Environmental Science and Policy, Stanford University (Spring 2006, Rosamond L., “Environmental Safeguards for Open-Ocean Aquaculture,” <http://issues.org/22-3/naylor/>, JMP)

Are current federal laws sufficient to protect the environment in the EEZ? The answer is no. As a framework, they leave major gaps in environmental protection. The Rivers and Harbors Act gives the Army Corps of Engineers the authority to issue permits for any obstruction in federal waters (including fish cages) but does not provide clear environmental mandates. The Corps has the broad discretion to ensure environmental quality but is not required to do so. The Outer Continental Shelf Lands Act extends this authority farther offshore beyond the territorial waters of the EEZ and applies to any offshore facilities that are anchored on or up to 1 mile from offshore oil rigs; in this case, further permit approval is required from the Department of Interior. The Clean Water Act gives the Environmental Protection Agency (EPA) the authority to regulate waste discharges from aquaculture facilities, but the agency’s recent effluent guidelines for aquaculture net pens, which presumably would be applied to offshore cages, focus simply on the use of best management practices. Aquaculture discharge is not currently regulated through the National Pollution Discharge Elimination System (NPDES), the permitting system used for municipal and industrial point-source discharge to U.S. waters. The Endangered Species Act and the Marine Mammal Protection Act both are applicable in the EEZ and can be used to limit offshore aquaculture operations if they are proven to threaten any listed threatened or endangered species, or if they unlawfully kill marine mammals. In addition, the Lacey Act gives the U.S. Fish and Wildlife Service the authority to regulate the introduction of exotic species in federal waters if they have been listed specifically as “injurious” to other species. The Lacey Act applies to any species that are transported or traded across borders, but not to species that already exist within borders. Finally, all international treaties and protocols would apply to offshore aquaculture in the EEZ.

The only federal law that the proposed bill would explicitly supersede is the Magnuson-Stevens Act (MSA) of 1976, which stipulates a balance between fishing and conservation. S. 1195 does not include any specific balancing requirements between ecosystems and industry. Regional fishery management councils established under the MSA as well as the public would be consulted in the process of environmental rulemaking but would not have a determining effect on the outcome.

Although S. 1195 supersedes only one federal law, existing legislation does not adequately address the major risks of farmed fish escapes and genetic dilution of wild stocks, pathogen transmission from farms to wild organisms, and cumulative effluent discharge. Most existing laws and regulations for marine aquaculture are found at the state level, where current near-shore systems operate. Few states have comprehensive regulatory plans for marine aquaculture, and there are no regional plans that address the risks of biological, chemical, or nutrient pollution that spreads from one coastal state to the next.

### --- Offshore Aquaculture is More Expensive

#### Offshore aquaculture is more expensive --- requires tougher infrastructure

Naylor, 6 --- Fellow at the Center for Environmental Science and Policy, Stanford University (Spring 2006, Rosamond L., “Environmental Safeguards for Open-Ocean Aquaculture,” <http://issues.org/22-3/naylor/>, JMP)

Open-ocean aquaculture encompasses a variety of species and infrastructure designs; in the United States, submersible cages are the model used for offshore finfish production. These cages are anchored to the ocean floor but can be moved within the water column; they are tethered to buoys that contain an equipment room and feeding mechanism; and they can be large enough to hold hundreds of thousands of fish in a single cage. Robotics are often used for cage maintenance, inspection, cleaning, and monitoring. Submersible cages have the advantage of avoiding rough water at the surface and reducing interference with navigation. A major disadvantage of offshore operations is that they tend to be expensive to install and operate. They require sturdier infrastructure than near-shore systems, they are more difficult to access, and the labor costs are typically higher than for coastal systems.

The economic requirements of open-ocean aquaculture suggest that firms are likely to target lucrative species for large-scale development or niche markets. In the United States, moi is produced commercially far from shore in Hawaii state waters, and experiments are being conducted with halibut, haddock, cod, flounder, amberjack, red drum, snapper, pompano, and cobia in other parts of the country. Tuna is another likely candidate for offshore development. Altogether, about 500 tons of fish are currently produced each year in submersible cages in the United States, primarily within a few miles of shore. The technology appears to have real promise, even though it is not yet economically viable for commercial use in most locations, and it is not yet deployed widely in federal waters far from shore.

### --- Farmed Fish Less Healthy

#### Farmed fish aren’t as healthy

McCutcheon, 14 (3/27/2014, Jody, “Something Fishy? Aquaculture and the Environment,” <http://eluxemagazine.com/magazine/theres-something-fishy-aquaculture/>, JMP)

For consumers, farmed fish provides a cheap alternative to wild fish, but they aren’t quite the same as their wild cousins. Due to a relatively sedentary lifestyle, farmed salmon tend to contain higher fat and lower protein levels, as well as lower percentages of omega-3 fatty acids and a less favourable ratio of omega-3 to omega-6 fatty acids, which mitigates omega 3’s cardiovascular benefits. And awful truth be told, farmed salmon fillets usually are usually a dull grey until chemically dyed pink.

### 1nc Solvency

#### Offshore aquaculture stymied by a number of factors

Klinger & Naylor, 12 --- \*Ph.D. student in Stanford's Emmett Interdisciplinary Program in Environmental and Resources, AND \*\*professor of environmental Earth system science at Stanford (Dane & Rosamond, “Searching for Solutions in Aquaculture: Charting a Sustainable Course,” <http://woods.stanford.edu/sites/default/files/files/searching%20for%20solutions%20in%20aquaculture.pdf>, JMP)

Nonetheless, offshore aquaculture systems also present significant social, economic, and ecological challenges. Land-based aquaculture is typically located on private land, but marine aquaculture is often located in public coastal waters, creating use conflicts and equity issues with other public and private users, including the privatization of historical commons (129–131). The analyses of profitability of offshore aquaculture under present conditions are mixed (127, 132–135). Offshore operations are capital intensive and have high production costs, which must be recouped in productivity or price increases if operations are to be economically viable (120, 122, 126). Investment is currently stymied by regulatory and operational uncertainties, including permitting, structural engineering, remote feeding tools, mortality retrieval systems, and communications and monitoring systems that allow operations to function offshore (120, 121, 131).

#### Consolidating responsibility in one agency will fail

Daniels & Browdy, 02 --- \*President of the U.S. Aquaculture Society, AND \*\*President of World Aquaculture Society (9/26/2002, Dr. William H. Daniels and Dr. Craig Browdy, President, <http://govinfo.library.unt.edu/oceancommission/meetings/june13_14_02/answers/daniels_answers.pdf>, JMP)

2) Is there a need to consolidate Federal responsibility for aquaculture under one agency and, if so, what would be benefits?

At present, there are many varied aquaculture related activities, programs, authorities and jurisdictions spread throughout numerous agencies in several government departments (primarily Agriculture, Interior, and Commerce). There are many good programs included which can do much to contribute to responsible development of marine aquaculture in the United States. Aquaculture is a diverse activity involving many different parts of the federal government and as such consolidation under one agency would likely not be in the best interest of the industry or the American people. Currently, by statute, aquaculture coordination occurs in a unique body: the Joint Subcommittee on Aquaculture (JSA) chaired by the Secretary of Agriculture. The JSA includes vice-chairs from Commerce and Interior and an executive secretary. The JSA has effective national working groups and task forces addressing important aquaculture issues. The JSA should be supported and strengthened with full-time staff to support national aquaculture priorities. Central coordination could be significantly improved by designating a lead individual or office in each department to coordinate the broad and diverse activities in this sector within each department and to act as a liaison through the JSA between departments. This would improve effectiveness and coordination while reducing redundancy to better coordinate national aquaculture policy development and implementation.

Again, thank you for allowing us to provide input into the decision-making process. If you have any further questions, please do not hesitate to contact us.

#### Better fishing practices in the U.S. have not been modeled

Plumer, 14 (5/8/2014, Brad, “How the US stopped its fisheries from collapsing,” <http://www.vox.com/2014/5/8/5669120/how-the-us-stopped-its-fisheries-from-collapsing>, JMP)

By contrast, more than 80 percent of the world's fish are caught in the rest of the world, in places like Asia and Africa — where rules are often less strict. The data here is fairly patchy, but the paper notes that many of these nations are less likely to follow the UN's Code of Conduct for Responsible Fisheries, and there's evidence that "serious depletions" may be occurring there:

[Graph Omitted]

1-s2.0-s0025326x13003044-gr2

Correlation of compliance with the FAO (UN) Code of Conduct for Responsible Fisheries (on a scale of zero to ten) with the UN Human Development Index for 53 countries, representing 95% of the world fish catch.

"It all depends where you look," Pitcher told me in an interview last year. "There are a few places where fisheries are doing better: The US, Australia, Canada, Norway. But those are relatively rare. In most places, the evidence suggests that things are getting worse."

In theory, other countries could try to adopt similar measures: catch limits, better planning, rules against illegal fishing. One problem? Doing proper fish assessments is expensive and difficult — the United States doesn't even do it for all its stocks yet. And, for now, those practices haven't yet spread everywhere.

### --- XT: Number of Barriers for Aquaculture

#### Can’t solve --- number of factors are driving aquaculture companies away from the U.S.

Knapp, 12 --- Professor of Economics at the Institute of Social and Economic Research, University of Alaska Anchorage (Gunnar, “The Political Economics of United States Marine Aquaculture,” <http://www.fra.affrc.go.jp/bulletin/bull/bull35/35-7.pdf>, JMP)

　According to a review in a recent study of why some aquaculture companies were leaving the United States to invest in other countries, “previous research indicates that strict regulatory environment, cost uncertainties, weak government advocacy, strong local decision-making authority, large number of coastal land owners’ opposition, environmental constraints, poor marketing” were factors (Chu, 2009, citing Lockwood, 2001b; Anderson and Bettencourt, 1993; National Research Council, 1992).

#### Number of barriers for aquaculture

Naylor, 6 --- Fellow at the Center for Environmental Science and Policy, Stanford University (Spring 2006, Rosamond L., “Environmental Safeguards for Open-Ocean Aquaculture,” <http://issues.org/22-3/naylor/>, JMP)

The technology is in place for marine aquaculture development in the United States, but growth remains curtailed by the lack of unpolluted sites for shellfish production, competing uses of coastal waters, environmental concerns, and low market prices for some major commodities such as Atlantic salmon. Meanwhile, the demand for marine fish and shellfish continues to rise more rapidly than domestic production, adding to an increasing U.S. seafood deficit (now about $8 billion annually).

## Politics Links

### 1nc Politics Link

#### Entrenched political opposition to the plan

Frezza, 12 --- fellow at the Competitive Enterprise Institute and a Boston-based venture capitalist (11/26/2012, Bill, “Regulatory Uncertainty Drives Fish Farmer to Foreign Waters,” <http://www.realclearmarkets.com/articles/2012/11/26/regulatory_uncertainty_drives_fish_farmer_to_foreign_waters_100008.html>, JMP)

NOAA made several attempts a decade ago to promote a national aquatic farming initiative that would cut through the red tape and set up a one-stop-shop for deep-water fish farming permits. Bills were introduced in Congress twice but were shot down due to opposition from entrenched fishing interests. While this sort of short-term protectionism is always politically popular, the reality is that domestic fisheries continue to shrink due to catch limitations. A thriving deep water aquaculture industry could provide sustainable jobs for old fishing communities, repurposing much of the fishing fleet and dockside infrastructure to handle the new business.

### --- XT: Politics Link

#### Opposition to the plan and it crowds out the agenda --- link is empirically true

Richardson, 11 (12/1/2011, White, “Fishing for a future, part 2 | Facing mounting costs and restricted access, Maine fishermen find new opportunities in a growing aquaculture industry,” <http://www.mainebiz.biz/article/20100208/CURRENTEDITION/302089998/fishing-for-a-future-part-2-|-facing-mounting-costs-and-restricted-access-maine-fishermen-find-new-opportunities-in-a-growing-aquaculture-industry>, JMP)

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There's not much hope this current bill will fare any better than its predecessors. Both sides - the environmental lobby and the aquaculture industry - have problems with it, according to advocates for each.

#### Political deck is stacked against aquaculture --- opponents are stronger and better mobilized

Knapp, 12 --- Professor of Economics at the Institute of Social and Economic Research, University of Alaska Anchorage (Gunnar, “The Political Economics of United States Marine Aquaculture,” <http://www.fra.affrc.go.jp/bulletin/bull/bull35/35-7.pdf>, JMP)

Why are United States Policies Unfavorable to Marine Aquaculture?

　The starting point in addressing the political challenges to U.S. marine aquaculture has to be clear thinking about why U.S. marine aquaculture faces unfavorable leasing and regulatory policies. Here are five broad contributing factors:

1. Marine aquaculture is new and small.

2. Fish and marine waters are traditionally public resources.

3. Many Americans perceive potential negative effects of marine aquaculture without offsetting positive effects.

4. NGOs have systematically and effective opposed marine aquaculture.

5. The governance system for leasing and regulation is structurally biased against U.S. marine aquaculture.

1. Marine aquaculture is new and small: Being new and small raises economic challenges for U.S. marine aquaculture. It cannot achieve economies of scale in production, processing, transportation and marketing. It cannot learn and innovate from practical experience.

　But being new and small also raises political challenges for U.S. marine aquaculture. Because it is new and small, it is harder to demonstrate the benefits and easier to exaggerate the risks of marine aquaculture (Figure 3). As noted by Tiersch and Hargreaves (2002), new resource industries such as aquaculture face a different political playing field than older resource industries such as logging:

　　“A core concept of the environmental movement is the precautionary principle, which basically states that it is wise to avoid unnecessary risk… This principle is biased towards slowing or stopping the development of new activities, and shifts the burden of proof from environmental advocates to practitioners such that new activities, like aquaculture, must show that they will not be a problem in the future. This is in contrast to the situation for established industries － detractors must prove that the established industry presents a problem. Of course, newer industries also lack the financial and political resources of groups such as logging, mining and petroleum extraction interests and large chemical corporations. It is easier to restrict or stop aquaculture projects, despite their much smaller environmental risk than it is to attempt to control more damaging established activities.

Thus opposing aquaculture development is viewed by advocacy groups as applying an ounce of prevention now instead of the pound of cure that would be required later.”

　To overcome the political challenges it faces, U.S. marine aquaculture will need committed supporters at all levels of the political and policy process. It will need fish farmers and employees who tell their friends and neighbors and elected officials about the benefits of aquaculture. It will need supporters who will testify at local public meetings, write letters to the editor, and are elected to local, state, and federal office. It will need organized lobbying efforts to influence state and federal agencies and politicians. All of this takes committed people and money.

#### Opponents empirically mobilize to block aquaculture development

\*\*\*Note --- the plan essentially passes the National Sustainable Offshore Aquaculture Act (explained in 1ac Johns, 13 ev)

Johns, 13 --- J.D. Candidate, USC Law 2013 (March 2013, Kristen L., Southern California Law Review, FARM FISHING HOLES: GAPS IN FEDERAL REGULATION OF OFFSHORE AQUACULTURE,” 86 S. Cal. L. Rev. 681, JMP)

Despite being endorsed by many environmental organizations, the National Sustainable Offshore Aquaculture bill died in the 112th Congress and was referred to the House Committee on Natural Resources, having received zero cosponsors. n218 The bill's failure may be due in part to the actions of the usual aquaculture opponents. Indeed, after the bill was first introduced in 2009, an organization of commercial fishermen sent a letter to the House of Representatives voicing its opposition, criticizing the bill for allowing "offshore aquaculture to be permitted in federal waters with limited safeguards and little or no accountability," n219 and urging the House to "develop legislation to stop federal efforts to rush growth of the offshore aquaculture industry." n220 Furthermore, NOAA has yet to publicly endorse [\*721] or even issue a position on the bill. Agencies such as NOAA and other environmental organizations must soon come forward in loud support of the bill to see that it is reintroduced and successful in Congress. If they do not, the current lack of any comprehensive regulatory regime may very well sink the entire offshore aquaculture industry.

#### Link is empirically true

Johns, 13 --- J.D. Candidate, USC Law 2013 (March 2013, Kristen L., Southern California Law Review, FARM FISHING HOLES: GAPS IN FEDERAL REGULATION OF OFFSHORE AQUACULTURE,” 86 S. Cal. L. Rev. 681, JMP)

As of 2013, Congress had yet to establish by legislation any such framework. However, this is not to say that legislators have not tried. Several bills have come before the House that, if enacted, would set up a comprehensive regulatory framework for offshore aquaculture. So far, Congress has failed to take the bait.

#### Plan must overcome political barriers

Knapp, 12 --- Professor of Economics at the Institute of Social and Economic Research, University of Alaska Anchorage (Gunnar, “The Political Economics of United States Marine Aquaculture,” <http://www.fra.affrc.go.jp/bulletin/bull/bull35/35-7.pdf>, JMP)

　Given the importance of government regulatory and leasing policies, United States marine aquaculture supporters － those who believe that U.S. marine aquaculture can and should grow and that Americans would benefit from it － need to think carefully and clearly about why United States policies are unfavorable toward marine aquaculture, and what they can do to change those policies. This means that they need to think about the political economics of U.S. marine aquaculture: what influences policies, and how policies influence and are influenced by the economics of aquaculture. Marine aquaculture poses significant technical challenges, such as how to design cages, rear juveniles, and increase feed conversion efficiencies. It poses significant economic challenges, such as how to market production effectively and reduce costs. Not surprisingly, aquaculture specialists tend to be trained to address these kinds of challenges and to focus on these kinds of challenges. However, U.S. marine aquaculture supporters need to recognize that the political challenges faced by U.S. marine aquaculture are as important as the technical and economic challenges. It will require concerted effort to understand and overcome these political challenges in order to achieve leasing and regulatory policies that will enable and encourage responsible development of U.S. marine aquaculture.

#### Wild fish concerns ensure political backlash

Winter, 9 (4/23/2009, Allison, “Obama admin hands offshore aquaculture oversight to NOAA,” <http://www.nytimes.com/gwire/2009/04/23/23greenwire-obama-admin-hands-offshore-aquaculture-oversig-10648.html>, JMP)

The Bush administration made several attempts, starting in 2005, to create a permitting system to expand U.S. aquaculture to as far as 200 miles offshore. The proposals did not gain traction on Capitol Hill, because lawmakers said they feared there were not enough safeguards to protect wild fish.

The issue surfaced again earlier this year when a federal fisheries council in the Gulf of Mexico voted to open its waters to offshore fish farms -- a proposal that must go through NOAA for final approval.

### --- AT: Link Turns \*\*\*

#### NGO mobilization ensures that the opposition drowns out any support

Knapp, 12 --- Professor of Economics at the Institute of Social and Economic Research, University of Alaska Anchorage (Gunnar, “The Political Economics of United States Marine Aquaculture,” <http://www.fra.affrc.go.jp/bulletin/bull/bull35/35-7.pdf>, JMP)

4. NGO’s have systematically and effectively opposed U.S. marine aquaculture: Numerous U.S. Non-Governmental Organizations (NGOs) have invested significant funding and effort to advocate banning, delaying, restricting, or regulating U.S. marine aquaculture in ways that increase the risks and costs of investment. Collectively these organizations have played a major role in influencing the public, the press, politicians, and regulators in ways which have contributed to unfavorable leasing and regulatory policies towards marine aquaculture.

　NGOs that have funded or engaged in significant advocacy to influence U.S. marine aquaculture policies include the Packard Foundation, the Moore Foundation, the Pew Charitable Trusts, Greenpeace, the Environmental Defense Fund, Food and Water Watch, and others, both large and small. The scale, objectives, strategies, and arguments of these groups vary widely, making it difficult to generalize about their motives, methods, and effects. All of these organizations would assert that they use rational and science-based arguments to advocate for the public interest. Marine aquaculture supporters would argue that the NGOs engaged in aquaculture advocacy range from responsible to grossly irresponsible and that they pursue strategies ranging from ethical to grossly unethical.

　As noted by Tiersch and Hargreaves (2002), “Advocacy groups can provide a valuable service by acting as an impartial watchdog of environmental issues and calling attention to legitimate concerns.” However, a very real and frustrating challenge for marine aquaculture supporters is that some NGOs appear willing to say anything to oppose marine aquaculture, with casual and sometimes blatant disregard for objectivity, truth, or the complex reality of what experience and science have shown about the hugely varied effects of the hugely varied kinds of activities collectively known as aquaculture. Here, for example is a statement posted on the website of the NGO Food and Water Watch:

　　“Many fish-lovers would be horrified to learn that huge quantities of fish and shrimp are now being grown in giant nets, cages, and ponds where antibiotics, hormones and pesticides mingle with disease and waste. These industrialized aquaculture facilities are rapidly replacing natural methods of fishing that have been used to catch fresh, wild seafood for millennia.”

　It is difficult for people in industry, government or science to refute these kinds of arguments when they are held to much higher standards of argument and evidence.

　Amplifying the efforts of NGO aquaculture advocacy are articles in the popular and increasingly in the so-called‘ scientific’ press. Tiersch and Hargreaves (2002) characterized this relationship as follows:

　　“Much of the criticism of aquaculture by NGOs began as opinion pieces in news media or as information provided by specific advocacy groups. Gradually this material began entering scientific literature as news items and recently has shifted into the arena of scientific review and technical articles, and special reports for commissions. In effect, NGOs have become clearinghouses for information critical of aquaculture. Various groups have adopted attacks through popular media as a method to bring about changes in popular opinion and regulatory policy. This approach is not discouraged by the media because sensational accusations, controversy and polarized debate are considered to be newsworthy simply for their mass appeal rather than scientific validity.”

A familiar and frustrating experience for marine aquaculture supporters is the appearance in respected scientific journals, such as Science and Nature, of articles of questionable scientific validity or objectivity that claim to demonstrate negative effects of marine aquaculture － such as environmental damage or health risks of aquaculture products (Naylor et al., 2000; Hites et al., 2004). In some cases the research was funded by NGOs with the specific stated objective of demonstrating negative effects － as opposed to objectively examining the evidence for such effects (Krause, 2010a; b; Krause, 2011a; b). These articles then receive extensive attention in the popular press － often ensured by planned publicity campaigns of the sponsoring NGOs. The other side of the story － objective scientific review and critiques of the research methodology and conclusions － is rarely heard. It is rarely heard in the review processes of the scientific journals. It is rarely heard in the pages of scientific journals, which rarely publish rebuttal articles. It is rarely heard in the popular press, which is less interested in the other side of the story because it’s more confusing and nuanced and is less interesting － and because marine aquaculture supporters have no organized, planned publicity campaign to tell the other side of the story. Put simply, both scientific and press articles are easier to publish and get more attention if they indicate that aquaculture is bad than if they suggest that the studies that say aquaculture is bad are flawed.

　With the public, politicians, and regulators facing a relentless barrage of negative messages from NGOs and the scientific and popular press, fish farmers face an uphill political battle (Figure 5).

　Adding to the challenge is that although much of the NGO opposition is targeted at specific effects of specific types of aquaculture, enough of it is directed generally at all“ fish farming” to negatively influence perceptions and polices for all marine aquaculture － all species, nationwide. Consider the greeting card sold by the Monterey Bay Aquarium (Figure 6) that argues that “farmed fish aren’t the answer.” This kind of argument simplistically, unfairly and irresponsibly implies that all kinds of aquaculture are bad － creating perceptions that work against even the most responsible, benign and beneficial kinds of aquaculture.

#### Link outweighs --- opponents play up perceived negatives

Howell, et. al, 14 --- PhD, Project Director of Report and Research Director for Future of Fish (1/15/2014, Colleen, Future of Fish, “Breakthrough Aquaculture: Uncovering solutions that drive ecologically sound and commercially viable models for farm-raised seafood,” <http://www.futureoffish.org/sites/default/files/docs/resources/Aquaculture_Report_FoF_2014.pdf>, JMP)

Aquaculture is further challenged with resistance from many people who are opposed to having fish farms established in their neighborhoods or along their coastlines. Regardless of how benign the farms might actually be, the popular perception is that they will be ugly, noisy, smelly, polluting, or otherwise unpleasant enough to spoil the neighborhood and reduce property values. Citizen complaints often drive laws and regulations that prohibit or effectively prevent aquaculture from growing as an industry in the US. Although some legislation rightly aims to protect public health and preserve natural areas by establishing strict guidelines with respect to farming fish, many laws lack flexibility and, thus, hamper innovation and entrepreneurship. Appendix I (page 33) outlines aquaculture regulations for a number of key states.

The ecological issues associated with aquaculture depend on myriad factors related to species, production system, management regime, inputs, geography, and the surrounding environment, among other dynamics. Full descriptions of those issues, as well as definitions of common production systems, are outlined in Appendix II (page 39). Of specific concern are water use and pollution, feed, sources of brood stocks, land conversion and habitat loss, antibiotics and chemical inputs, escapees, and disease. Opponents to farmed fish tend to magnify those negative impacts, which further taints aquaculture in the mind of the consumer and toughens efforts to grow demand, build markets, and attract investment.

### --- AT: Support for Environmentally Safe Aquaculture

#### Perception of negatives taints view of all aquaculture

Howell, et. al, 14 --- PhD, Project Director of Report and Research Director for Future of Fish (1/15/2014, Colleen, Future of Fish, “Breakthrough Aquaculture: Uncovering solutions that drive ecologically sound and commercially viable models for farm-raised seafood,” <http://www.futureoffish.org/sites/default/files/docs/resources/Aquaculture_Report_FoF_2014.pdf>, JMP)

BARRIERS

The core challenges of a problem which, if successfully resolved, could pave the way for real progress. Barriers are not immutable conditions; they must be moveable and changeable. Hostile Public and Regulatory Environment. Formal regulation as well as public perception make starting and operating a farm challenging and costly. In some cases, regulations are so strict that new types of aquaculture are not permitted; in other cases, the lack of any regulation makes it impossible to grow and market a product. Meanwhile, the NIMBY attitude among home owners creates strong opposition to even low-profile coastal farms, while local fishing communities voice opposition out of fear that farms will limit access to fishing grounds or introduce disease. A reputation for pollution, environmental harm, and disease associated with certain types of aquaculture (mostly shrimp and salmon) taints public perception of all aquaculture, driving resistance to even the most environmentally friendly models.

### --- AT: No Link --- No New Spending

#### Internal tradeoffs ensure the plan is contentious

English, 13 --- Director of Science Policy Outreach at COMPASS (3/25/2013, Chad, “Budget Trade-offs: A Zero-Sum Game,” http://compassblogs.org/blog/2013/03/25/what-to-do-when-the-budget-becomes-a-zero-sum-game/, JMP)

“Should this dollar go to the NSF or to the FBI? It can’t go to both. You have to respect the people who make that decision.”

David Goldston of the Natural Resources Defense Council made this comment in front of a full room at the AAAS annual meeting last month (you can find paraphrases of this comment in the Twitter stream, Storified here). This is a very real choice, and it’s being set up right now through the federal budget process. There are thousands of people on Capitol Hill this week trying to make the case for their programs including probably hundreds of scientists and science supporters.

The seemingly endless budget and spending and sequestration noise coming out of D.C. can seem overwhelming and tedious. With sequestration threatening even the annual White House Easter egg roll, the budget rhetoric in D.C. remains heated and the gridlock seems complete. The President still hasn’t released a budget proposal for 2014 and now isn’t expected to until next month (despite my earlier prognostication). But for Congress, the budget process is marching on, and the tradeoff David described is getting set up right now.

Remember, the federal budget is intractably large (approximately 50 million times larger than the typical household budget) so it gets divided into smaller pieces. Budget allocations make up the first round of dividing up the federal budget. The Appropriations Committees (there’s one in the House and one in the Senate) are divided into subcommittees. Each subcommittee gets a slice of the budget, which they then allocate into final spending numbers for each department, office, and program within the federal government.

Each Appropriations subcommittee works with their slice of the budget, called (opaquely) their 302(b) sub-allocation. But here’s the important part: Once those sub-allocations are set, it’s a zero-sum game within that subcommittee; a dollar to one program must mean a dollar less for other programs. For scientists, the Commerce, Science, Justice and Related Agencies subcommittee is one of the big ones to watch. It determines the budget for the National Science Foundation (NSF), the National Oceanic and Atmospheric Administration (NOAA), and the National Institute of Standards and Technology (NIST). But it also sets the budget for the Federal Bureau of Investigation (FBI), the Commission on Civil Rights, the Drug Enforcement Administration, the U.S. Marshal Service, and others. Once that’s set, any additional dollar that goes to NSF must come out of one of these other agency’s budgets. (The Washington Post reported today that the continuing resolution process to keep the government running the rest of this year is facing the same situation.)

This is how we get to the scenario David alluded to. Asking a member of Congress to support funding for science is implicitly asking them to trade away something else for that money, and those are neither simple nor easy decisions. Each thing that you might trade away has a constituency that cares deeply or even depends upon it… and that member of Congress? It’s their job to represent that constituency, too. While the budget is the focus of discussion now, these concepts apply to any issue that a policymaker faces.

When you talk to a member of Congress, make your case, give them the context they need to make their decision, and respect – even acknowledge – the tradeoffs they face. You’ll be more credible, you’ll be giving them more of what they need, and you’ll be on your way to becoming a trusted source of input.

### 2nc Link Turns the Case

#### Congressional backlash turns the case --- will withhold funds to implement the plan AND NOAA is a lightning rod for controversy

Jensen, 12 (4/27/2012, Andrew, “Congress takes another ax to NOAA budget,” <http://peninsulaclarion.com/news/2012-04-27/congress-takes-another-ax-to-noaa-budget>, JMP)

Frustrated senators from coastal states are wielding the power of the purse to rein in the National Oceanic and Atmospheric Administration and refocus the agency's priorities on its core missions.

During recent appropriations subcommittee hearings April 17, Sen. Lisa Murkowski ensured no funds would be provided in fiscal year 2013 for coastal marine spatial planning, a key component of President Barack Obama's National Ocean Policy.

Murkowski also pushed for an additional $3 million for regional fishery management councils and secured $15 million for the Pacific Salmon Treaty that was in line to be cut by NOAA's proposed budget (for $65 million total).

On April 24, the full Senate Appropriations Committee approved the Commerce Department budget with language inserted by Sen. John Kerry, D-Mass., and Sen. Olympia Snowe, R-Maine, into NOAA's budget that would transfer $119 million currently unrestricted funds and require they be used for stock assessments, surveys and monitoring, cooperative research and fisheries grants.

The $119 million is derived from Saltonstall-Kennedy funds, which are levies collected on seafood imports by the Department of Agriculture. Thirty percent of the import levies are transferred to NOAA annually, and without Kerry's language there are no restrictions on how NOAA may use the funds.

In a Congress defined by fierce partisanship, no federal agency has drawn as much fire from both parties as NOAA and its Administrator Jane Lubchenco.

Sen. Scott Brown, R-Mass., has repeatedly demanded accountability for NOAA Office of Law Enforcement abuses uncovered by the Commerce Department Inspector General that included the use of fishermen's fines to purchase a luxury boat that was only used for joyriding around Puget Sound.

There is currently another Inspector General finvestigation under way into the regional fishery management council rulemaking process that was requested last August by Massachusetts Reps. John Tierney and Barney Frank, both Democrats.

In July 2010, both Frank and Tierney called for Lubchenco to step down, a remarkable statement for members of Obama's party to make about one of his top appointments.

Frank introduced companion legislation to Kerry's in the House earlier this year, where it should sail through in a body that has repeatedly stripped out tens of millions in budget requests for catch share programs. Catch share programs are Lubchenco's favored policy for fisheries management and have been widely panned after implementation in New England in 2010 resulted in massive consolidation of the groundfish catch onto the largest fishing vessels.

Another New England crisis this year with Gulf of Maine cod also drove Kerry's action after a two-year old stock assessment was revised sharply downward and threatened to close down the fishery. Unlike many fisheries in Alaska such as pollock, crab and halibut, there are not annual stock assessment surveys around the country.

Without a new stock assessment for Gulf of Maine cod, the 2013 season will be in jeopardy.

"I applaud Senator Kerry for his leadership on this issue and for making sure that this funding is used for its intended purpose - to help the fishing industry, not to cover NOAA's administrative overhead," Frank said in a statement. "We are at a critical juncture at which we absolutely must provide more funding for cooperative fisheries science so we can base management policies on sound data, and we should make good use of the world-class institutions in the Bay State which have special expertise in this area."

Alaska's Sen. Mark Begich and Murkowski, as well as Rep. Don Young have also denounced the National Ocean Policy as particularly misguided, not only for diverting core funding in a time of tightening budgets but for creating a massive new bureaucracy that threatens to overlap existing authorities for the regional fishery management councils and local governments.

The first 92 pages of the draft policy released Jan. 12 call for more than 50 actions, nine priorities, a new National Ocean Council, nine Regional Planning Bodies tasked with creating Coastal Marine Spatial Plans, several interagency committees and taskforces, pilot projects, training in ecosystem-based management for federal employees, new water quality standards and the incorporation of the policy into regulatory and permitting decisions.

Some of the action items call for the involvement of as many as 27 federal agencies. Another requires high-quality marine waters to be identified and new or modified water quality and monitoring protocols to be established.

Young hosted a field hearing of the House Natural Resources Committee in Anchorage April 3 where he blasted the administration for refusing to explain exactly how it is paying for implementing the National Ocean Policy.

"This National Ocean Policy is a bad idea," Young said. "It will create more uncertainty for businesses and will limit job growth. It will also compound the potential for litigation by groups that oppose human activities. To make matters worse, the administration refuses to tell Congress how much money it will be diverting from other uses to fund this new policy."

Natural Resources Committee Chairman Doc Hastings, R-Wash., sent a letter House Appropriations Committee Chairman Hal Rogers asking that every appropriations bill expressly prohibit any funds to be used for implementing the National Ocean Policy.

Another letter was sent April 12 to Rogers by more than 80 stakeholder groups from the Gulf of Mexico to the Bering Sea echoing the call to ban all federal funds for use in the policy implementation.

"The risk of unintended economic and societal consequences remains high, due in part to the unprecedented geographic scale under which the policy is to be established," the stakeholder letter states. "Concerns are further heightened because the policy has already been cited as justification in a federal decision restricting access to certain areas for commercial activity."

### National Ocean Policy Link

#### Implementation will require significant political capital and force compromises that undermine part of the national policy

Studley, 9 --- J.D. Candidate at the University of South Carolina School of Law (Fall 2009, Christopher Shane Studley, Southeastern Environmental Law Journal, “OCEAN POLICY AND CHANGE: IS THERE HOPE FOR OCEAN REFORM?” 18 Southeastern Envtl. L.J. 105, JMP)

VI. CHALLENGES

There are many obstacles to overcome before ocean policy reform occurs. The reforms proposed by the 2009 Task Force represent a sweeping and dramatic change in United States ocean policy, and implementation of those changes will test the determination and will of the Obama Administration, Congress, and of the American people because of the vast difference in the recommendations and the current ocean policy in the United States. The Task Force's creation of a unified National Policy to serve as a guiding vision was a significant step towards instituting change. However, significant procedural and substantive challenges must be overcome before the National Policy can be realized. The United States [\*132] environmental policy process is exceedingly complex for two major reasons: (1) the difficultly in understanding and regulating complex ecological processes; and (2) the structure and process of the Nation's lawmaking institutions. n171

Some of the biggest challenges facing the implementation of the National Policy are the "complexity, scientific uncertainty, dynamism, precaution and controversy" inherent in governing a natural system as vast and diverse as the oceans, coasts, and Great Lakes. n172 As one commentator put it, "environmental law has difficulty developing legal rules because 'nature refuses to cooperate.'" n173 Regulation of an ecological system as diverse as the ocean is tremendously complicated because of the difficult task of establishing a legal framework that can both govern a complex, highly industrialized nation while protecting and still utilizing the natural resources the ocean provides. n174

Scientific uncertainty surrounding legislative decisions is an "inevitable feature" when trying to understand the mechanisms of a marine ecosystem. n175 The National Policy repeatedly advocates a "best available science" approach to making those decisions. n176 The "best available science" approach is difficult to apply because of the challenge of reaching a consensus on what the "best available science" means in a given situation. n177 Also, the quest to use the "best available science" might delay important environmental decision making, like the Reagan Administration's "'[g]ood science' . . . excuse," which slowed environmental decision-making. n178

[\*133] Similarly, ocean policy reform is further complicated by the dynamic nature of the oceans and society. n179 Today, the National Policy's proposed reforms, if adopted, may achieve many of the Task Force's goals. However, a dynamic shift in ecological processes, perhaps through climate change or even a significant restructuring of American society, perhaps with war or technological advances, might render the National Policy obsolete. n180

Like most environmental policies, the proposed National Policy is precautionary in nature, focusing on "prevention, rather than redress." n181 Precautionary legislation is particularly difficult because the resulting uncertain ecological consequences. n182 The inability to fully substantiate a particular course of action inevitably leads to controversy. n183 The proposed ocean reforms will likely encounter controversy because of the varied distributional impact on the different stakeholders and the vast regulated resource. n184 For example, government resources previously used to fund a program such as NASA may be redistributed to fund some provisions for the National Policy, thus causing controversy.

The difficult challenges presented by understanding and regulating a diverse ecosystem are not the only obstacles to meaningful ocean reform. The United States lawmaking infrastructure also presents a significant challenge. A tremendous amount of legislation is necessary to implement such significant reforms as proposed by the National Policy. Congress will need to create or amend legislation in order to adopt the proposed statement of the National Policy and policy coordination framework and to satisfy the objectives outlined in the Implementation Strategy. n185 The difficulty is that ocean policy law "must work within the constraints [allowed] by th[e] constitutional design for lawmaking [and] related political processes." n186 The United States' "tripartite system of government [and] our commitment to . . . federalism" limit the concentration of power but also create a myriad of "horizontal [and] vertical division[s] of authority" that prove especially difficult for environmental lawmaking. n187 This system of fragmented authority and decentralization of power makes ocean policy reform [\*134] especially difficult because the regulated areas are subject to numerous different jurisdictional authorities. n188 Fragmented and localized regulatory control may be too constricted to effectively remedy ecological injury, which would require concentration of authority to accomplish the goals of the National Policy. n189 While the constitutional barriers to ocean reform create "tension" that requires Congress to pay "close attention" when drafting ocean policy legislation, the barriers are not insurmountable. n190

The political nature of the United States' electoral and lawmaking processes also presents a significant hurdle to effective ocean reform. n191 Politically, comprehensive ocean reform is especially contentious because of its scope. This contentious nature requires substantial funding for success, and environmental advocates usually do not have the necessary resources to handle the large scope of comprehensive ocean reform. n192 Also, the vast scale and scope of ocean reform make it difficult to build meaningful support for comprehensive reform. n193 For example, political leaders from coastal states might be more concerned with the effect of agricultural runoff on coastal water quality than representatives from inland farming districts. Forging the political strength to implement the National Policy will inevitably take compromise, which may serve to weaken other objectives outlined in the National Policy. n194

Of the obstacles enumerated above, garnering sufficient political strength to implement the National Policy might prove to be the most difficult challenge. The debate surrounding whether the United States' would ratify of the 1982 U.N. Convention on the Law of the Sea can serve as a microcosm of this difficulty. n195 In 1982, the U.N. Convention on the [\*135] Law of the Sea went into effect. n196 The United States was a major contributor in drafting the treaty, and the treaty received strong endorsements from both major Ocean Commission reports. Yet the United States still has not ratified it because concerns about the provisions of deep-sea mining. n197 A major component of the proposed National Policy is the United States' ratification of the Law of the Sea. If ratifying a treaty largely drafted by the United States has proven politically impossible over the past 25 years, the political struggle to implement the comprehensive ocean policy reform proposed in the National Policy will be Herculean.

Notwithstanding the difficulty of the total policy reform, adoption of a unified statement of National Policy could be accomplished relatively easily. This unified statement would only require Congress to pass legislation acknowledging the proposed statement as the United States National Policy for the Oceans, Coasts, and the Great Lakes. n198 Further, without changing or amending current laws, Congress could "require that federal agencies administer U.S. policies and laws to the fullest extent possible consistent with [the N]ational [P]olicy." n199

Implementing the proposed policy coordination framework could prove to be a bit more challenging. Bureaucratic in-fighting and opposition to the proposed coordination of government authority will be a challenging task for Congress and the President. Likewise, to effectively achieve the objectives laid out in the National Policy, current legislation will need to be amended. Congress will either have to pursue an incremental approach, which builds on or amends existing legislation, or to start fresh and conduct a massive legislative overhaul. n200 Congress will also need to appropriate adequate funding for all of the proposed changes and create a dedicated funding stream to maintain the reform initiatives. n201

#### Implementation will be contentious --- individual stakeholders will fight to promote their interests

Studley, 9 --- J.D. Candidate at the University of South Carolina School of Law (Fall 2009, Christopher Shane Studley, Southeastern Environmental Law Journal, “OCEAN POLICY AND CHANGE: IS THERE HOPE FOR OCEAN REFORM?” 18 Southeastern Envtl. L.J. 105, JMP)

[\*136] VII. CONCLUSION

On June 12, 2009 President Barack Obama created a Task Force charged with developing a National Policy "to better meet our Nation's stewardship responsibilities for the oceans, coasts, and Great Lakes." n202 The Task Force developed a progressive and comprehensive proposed National Policy, Policy Coordination Framework, and Implementation Strategy. The proposed National Policy reflects the experience and knowledge collectively gained through decades of ocean policy practice, scientific research and human experience with the sea. n203 Each of the ambitious goals outlined by the Task Force will require tremendous political will, legislative action and economic commitment. Individual stakeholders in policy reform may fight to promote their interests and agenda over others, and these fights may slow the reform process. n204 The proposed recommendations might not become the National Policy for the United States. The challenges ahead are real, and the opposition is strong, but there is at least hope for meaningful ocean policy reform. There is hope that America's greatest asset will one day become her most treasured possession.

#### GOP fights to undercut the National Ocean Policy

CAP, 14 (3/10/2014, Center for American Progress, US Official News, “Washington: The Top 5 Challenges Facing the New NOAA Administrator,” Lexis, JMP)

Coordinating use of ocean space

In 2010, President Barack Obama issued an executive order establishing a National Ocean Policy. This action was the culmination of more than a decade of work, and implemented a key recommendation of the U.S. Commission on Ocean Policy established by President George W. Bush. President Obama’s policy establishes a National Ocean Council, bringing together more than two dozen federal agencies that have some jurisdiction over marine and Great Lakes activities with the goal of streamlining and coordinating the management of our ocean resources.

Government efficiency is a hallmark of the Republican Party’s political message, but rather than touting the National Ocean Policy for its gains in this regard, many conservatives have targeted it as a prime example of government regulatory overreach. They have repeatedly attached amendments to bills passing the House that block funding for activities related to the policy’s implementation. These proposals actually put NOAA’s budget at risk because many of the agency’s day-to-day programs provide data used to support initiatives of the National Ocean Policy. Most recently, Rep. Bill Flores (R-TX) successfully tacked on an amendment to the Water Resources Reform and Development Act that would prevent the U.S. Army Corps of Engineers from participating on the National Ocean Council.

### --- War Prevents National Ocean Policy Solvency

#### War will undermine solvency

Studley, 9 --- J.D. Candidate at the University of South Carolina School of Law (Fall 2009, Christopher Shane Studley, Southeastern Environmental Law Journal, “OCEAN POLICY AND CHANGE: IS THERE HOPE FOR OCEAN REFORM?” 18 Southeastern Envtl. L.J. 105, JMP)

[\*133] Similarly, ocean policy reform is further complicated by the dynamic nature of the oceans and society. n179 Today, the National Policy's proposed reforms, if adopted, may achieve many of the Task Force's goals. However, a dynamic shift in ecological processes, perhaps through climate change or even a significant restructuring of American society, perhaps with war or technological advances, might render the National Policy obsolete. n180

### Midterms Links --- Not Popular With Public

#### Public supporters outnumbered by opponents --- have more money and political influence

Knapp, 12 --- Professor of Economics at the Institute of Social and Economic Research, University of Alaska Anchorage (Gunnar, “The Political Economics of United States Marine Aquaculture,” <http://www.fra.affrc.go.jp/bulletin/bull/bull35/35-7.pdf>, JMP)

　Because U.S. marine aquaculture is new and small, relatively few Americans have － or realize they have － a direct stake in it. That means that it has fewer committed supporters, with less money and less political influence. In much of the United States marine aquaculture is still below a political threshold scale necessary for people to understand, accept, and effectively advocate for marine aquaculture. Achieving this scale will be critical to overcoming political challenges. Marine aquaculture will become politically stronger as it grows － but it is difficult for it to grow without being politically stronger.

#### Massive public opposition to the plan

Knapp, 12 --- Professor of Economics at the Institute of Social and Economic Research, University of Alaska Anchorage (Gunnar, “The Political Economics of United States Marine Aquaculture,” <http://www.fra.affrc.go.jp/bulletin/bull/bull35/35-7.pdf>, JMP)

3. Many Americans perceive potential negative effects of marine aquaculture without offsetting positive effects: A variety of groups of Americans perceive potential negative effects of marine aquaculture. These include:

•Commercial fishermen, who fear economic competition and environmental damage to wild fish stocks.

•Coastal residents, who fear loss of access to waterfront and changes in the views they enjoy.

•Environmentalists, who worry variously that marine aquaculture will cause pollution, harm marine ecosystems, or increase pressure on global wild fish stocks harvested for production of fishmeal and fish oil used in fish feeds.

　These groups play significant roles in the politics of United States marine aquaculture, across the political and regulatory process at local, state, and national levels. For example, Alaska salmon fishermen spearheaded the Alaska legislature’s 1990 ban on finfish farming, and continue to vocally oppose aquaculture development in federal waters nationwide, along with Alaska’s congressional delegation (Figure 4).

　Similarly, coastal residents have strongly and effectively opposed marine aquaculture in states such as Maine and Washington. Sebastian Belle, Executive Director of the Maine Aquaculture Association, described the political challenges facing aquaculture as a result of demographic shifts in coastal regions:

　　“In Maine…part of the application process for the series of permits and licenses needed to operate in the marine environment is an exhaustive series of meetings with the general public and all stakeholde. Part of the constituency will not like what you do, whatever you do. [Because of] a demographic shift to a population-base of retirees from other states, as summer-home visitors to our beautiful coast became year-round residents, …coastal communities now view the ocean for ‘recreational use,’ and commercial fishermen and aquaculturists must make their case locally to people who have no history or link with the ocean for making a living” (Thomas, 2011).

　These groups’ opposition is vexing and frustrating to marine aquaculture supporters who feel that the objections and fears of aquaculture opponents are exaggerated, unfounded, or simply irrational. How do you argue with people who － without any scientific basis － believe that marine aquaculture will destroy commercial fisheries? How do you argue with people who claim that fish farms that will be barely visible will destroy their coastal view? How do you argue with people who appear to be unwilling to accept any level of risk or change?

　The political reality is that it is rational for groups which perceive only negative potential effects of marine aquaculture to oppose it. Why accept any risk if there is nothing to be gained? Clearly there are many things to be gained from marine aquaculture; such as stable jobs, tax revenues, and synergies with other marine industries including commercial fishing, good food, and a reduction in import dependence. But, in many areas, aquaculture supporters have failed to make the case effectively that aquaculture has these positive potential benefits.

#### Necessary private use of water not supported by public

Knapp, 12 --- Professor of Economics at the Institute of Social and Economic Research, University of Alaska Anchorage (Gunnar, “The Political Economics of United States Marine Aquaculture,” <http://www.fra.affrc.go.jp/bulletin/bull/bull35/35-7.pdf>, JMP)

2. Marine fish and waters are traditionally public resources: The concept of private ownership of land is fully accepted in American law and culture. Although many Americans might think that governments should restrict certain uses of private land, few would argue that private ownership is wrong in principle. Many Americans oppose land-based resource development such as mining or logging or industrial agriculture, but they don’t generally base their opposition on the principle that land or resources shouldn’t be privately owned.

　In contrast, there is no tradition of private ownership of marine fish or waters in America. Many Americans oppose allowing private exclusive use of or rights to marine coastlines, water or fish. In many cases this principle is firmly set in law. For example, the Alaska Constitution states that, “ … in their natural state, fish, wildlife and waters are reserved to the people for common use.”

　The tradition that marine fish and waters are public resources imposes an extra political and regulatory hurdle for the development of aquaculture, especially for finfish farming. Before any kind of marine aquaculture can begin, new mechanisms need to be created to allow for exclusive use of marine waters.

　Efforts to implement rights-based management regimes for wild fisheries, such as individual fishing quotas, face similar strong philosophical resistance from many Americans. However, as these new management regimes are implemented, public attitudes are likely to shift as the economic logic and advantages of exclusive use rights become more apparent. The same process will likely occur with marine aquaculture － but it will take time.

## Sustainable Land-Based Aquaculture CP

### 1nc Sustainable Land-Based Aquaculture CP

#### The United States federal government should incentivize and implement an ecosystem approach to urban land-based aquaculture that requires the use of best available technologies, promotes adaptive management systems and constructs participatory mechanisms that allow for input by both the public as well as industry groups.

#### CP is comparatively better --- ensures sustainable expansion of land-based aquaculture, saves marines environment, solves seafood trade deficit, revitalizes urban areas and avoids litigation fights

Wheeler, 13 --- J.D. Candidate 2013, Golden Gate University School of Law (Spring 2013, Garrett Wheeler, Golden Gate University Environmental Law Journal, “COMMENT: A FEASIBLE ALTERNATIVE: THE LEGAL IMPLICATIONS OF AQUACULTURE IN THE UNITED STATES AND THE PROMISE OF SUSTAINABLE URBAN AQUACULTURE SYSTEMS,” 6 Golden Gate U. Envtl. L.J. 295, JMP)

The United States is now at a crossroads between implementing a regulatory system that encourages the growth of sustainable, ecologically sound aquaculture practices and continuing to foster operations that are environmentally perilous and subject to a bevy of tough environmental regulations. The environmental hazards associated with traditional land-based and current ocean-based aquaculture, both near-shore and in the [\*318] EEZ, are well founded and supported by a history of ecological degradation. n173 Escapes, disease, and water pollution are the most commonly cited examples, though they are only a fraction of the encountered problems. The consequence of these infractions is a trail of litigation and regulation left in the wake of reckless industry expansion. While the future of ocean-based aquaculture is unclear, its susceptibility to environmental regulation will almost certainly slow its growth dramatically in the United States.

Changes to the current regulatory approach are inevitable; the impending shift provides a momentous opportunity to implement a drastically improved system. Implementing an ecosystem approach to aquaculture (EAA) in the United States, and thereby promoting a sustainable aquaculture industry, is the first step toward a well-balanced and effective aquaculture regulatory structure.

An EAA is defined as "a strategy for the integration of the activity within the wider ecosystem such that it promotes sustainable development, equity, and resilience of interlinked social-ecological problems." n174 This approach, adopted by the Food and Agriculture Organization of the United Nations (FAO), places emphasis on all the essential components of sustainability - ecological, social, and economic - by considering wild fisheries and aquaculture as interdependent systems. n175 Although an EAA is often perceived as complex and difficult to implement, concrete examples of successful EAA implementation exist. n176

The advantages of an EAA are four-fold. First, the state of our damaged and depleted oceans will improve by allowing impaired aquatic ecosystems to regenerate and eventually support larger wild stocks. Second, the demand from consumers for high-quality, low-cost seafood free from pollutants and chemicals can be met with a domestic product that will ease the growing trade deficit caused by seafood importation from foreign markets. Third, because urban centers serve as major [\*319] distribution hubs, new jobs will be created, improving social and economic development in blighted areas. n177 Fourth, the needed infrastructure - water sources, warehouse space, and grocery and restaurant proximity - is already in place. The potential for sustainable urban aquaculture is limitless compared to open-ocean aquaculture, and unlike conventional land-based facilities and ocean-based farms, its growth is not likely to be stunted by regulation. Instead, law and policy makers are in a position to promote sustainable practices via a well-managed EAA.

Perhaps most fundamental to a workable and effective policy that utilizes an EAA approach is the use of best available technologies (BATs). Congress could accomplish with aquaculture much of what it has successfully accomplished in other effective environmental regulation contexts n178 by placing a mandate on operators to use technologies that limit harm to the environment while simultaneously enabling efficient production of seafood. BATs can also be implemented for use in decisionmaking, risk assessment, and project planning. Such technology-forcing legislation would result in expanded use of sustainable systems including RAS technology and would ensure that operators are presented with clear and explicit compliance guidelines.

In addition to encouraging the use of BATs, future law and policy initiatives should promote the use of adaptive management systems, or structured processes that reduce decision making uncertainties by increased system monitoring. Already used by state agencies such as the Massachusetts Department of Fish and Game, n179 adaptive management includes monitoring aquaculture facility performance, providing feedback to operators and regulators, and allowing for adjustments related to aspects of future management plans.

Throughout all implementation phases of an ecosystem-based approach, participatory mechanisms should be constructed to allow for input by both the public as well as industry groups. As with the National Environmental Protection Act and corresponding state laws that require a public-participation process for proposed agency action, n180 comment periods and public documentation should accompany the development of new aquaculture law and policy. Participatory mechanisms will allow [\*320] industry leaders, environmentalists, fishermen, and concerned citizens to partake in the construction and implementation of a new United States aquaculture industry.

VI. CONCLUSION: HELPING REVITALIZE AMERICAN CITIES

As the federal government continues to encourage the expansion of ocean-based aquaculture in the EEZ, not only will the environment be subject to an array of potential threats, but those looking to invest in the domestic production of seafood will also be confounded by legal uncertainties and liabilities imposed by the CWA and other laws. Rather than continue to press for an unsustainable system plagued by liability and staunch opposition from the environmental community and fishermen, new incentives in the form of grants, subsidies, and political support are needed to aid the development of a sustainable urban aquaculture industry. The alternative is to allow the American legal system to continue regulating through enforcement and litigation, an option that is both inefficient and costly.

Although the extent to which sustainable aquaculture practices will be implemented in the United States is not clear, the promise of domestic seafood production flourishing within its cities is real. Minimal impact on the environment equates to minimal legal expenditure, and investors and entrepreneurs are already beginning to show interest. It is the challenge and duty of future generations "to encourage the art of aquaculture in urban areas and plan creatively for its beauty and utility in revitalized cities." n181 In more concrete terms, urban aquaculture may be the only way to provide fresh, local seafood while steering clear of environmental problems and possible legal liability.

### 2nc Solvency

#### RAS facilities can bet set up anywhere on any scale --- produces fresh seafood with no environmental damage

Wheeler, 13 --- J.D. Candidate 2013, Golden Gate University School of Law (Spring 2013, Garrett Wheeler, Golden Gate University Environmental Law Journal, “COMMENT: A FEASIBLE ALTERNATIVE: THE LEGAL IMPLICATIONS OF AQUACULTURE IN THE UNITED STATES AND THE PROMISE OF SUSTAINABLE URBAN AQUACULTURE SYSTEMS,” 6 Golden Gate U. Envtl. L.J. 295, JMP)

V. PROBLEMS WITH CURRENT AQUACULTURE LAW AND POLICY AND THE PROMISE OF SUSTAINABLE URBAN AQUACULTURE

The current legal framework for aquaculture operations in the United States exists as a non-comprehensive, piecemeal collection of laws, policies, and regulations. The National Aquaculture Act of 1980 signaled an attempt by Congress to establish a comprehensive approach; however, the Act has yet to materialize into concrete, substantive law. n162 Instead, aquaculture operators are regulated by a vast array of laws, most [\*316] notably the federal Clean Water Act (CWA) and related state permitting requirements, the Resource Conservation and Recovery Act (RCRA), the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and the Rivers and Harbors Act (RHA).

There are three broad problems with the resulting regulatory overlap. First, because the regulatory system is comprised of numerous laws and regulations, each with specific jurisdictional boundaries, there is a great potential for the system to contain loopholes. For example, the CWA regulates only "navigable" waters and "territorial seas" within the United States, resulting in the possibility of less stringent standards for effluent discharge in the EEZ. Second, the piecemeal structure is inherently burdensome for potential aquaculture operators, investors, and industry leaders. The difficulty of determining proper compliance under all possibly applicable laws creates considerable risk for any person operating a non-sustainable aquaculture facility in the United States. Finally, the current legal framework does little to actively promote actual sustainable aquaculture practices.

Despite these deficiencies, RAS facilities are far better positioned to meet regulatory demands and cope with the current regulatory patchwork. Because RAS farms afford operators nearly total environmental control, optimized species growth can be achieved on a year-round basis, guaranteeing a product that is safe for consumers and the environment, and free of chemicals and heavy metals. n163 The scalability of RAS farms is equally impressive; they can be as tiny as a desktop, for personal use, or occupy large warehouses for commercial operation. n164 Finally, because RAS farms can be located almost anywhere, including in or near urban centers, community farms can minimize fuel used for transport and leave a miniscule carbon footprint. The warehouses of Cleveland, old industrial sites in Detroit, and even the desert of Las Vegas are all potential sites for producing fresh seafood. n165

RAS systems are currently used to grow catfish, striped bass, tilapia, crawfish, blue crabs, oysters, mussels, salmon, shrimp, and clams. Although the economic feasibility of commercial RAS operations is disputed, n166 several studies indicate real economic viability. n167 In [\*317] particular, operations located in urban areas present opportunity for real economic success. One study that examined the possible gains of an indoor tilapia industry in the state of New York concluded that "New York's competitive advantage is the ability to grow the highest possible quality tilapia product on the doorstep of the consuming market." n168 The report focused on urban areas as ideal locations for sustainable aquaculture facilities, pointing to product freshness, low transportation and processing costs, branding opportunities, and cheaper feed. n169 In addition, New York already has an existing aquaculture infrastructure, including several universities actively researching indoor systems and a host of business institutions with aquaculture expertise. n170 The urban areas in the United States ripe for aquaculture development include those American cities that could serve a large consumer base with minimal costs, such as Cleveland, Detroit, Los Angeles, or New York City. n171

#### The counterplan effectively scales up aquaculture and avoids fish escape and disease spread

Wheeler, 13 --- J.D. Candidate 2013, Golden Gate University School of Law (Spring 2013, Garrett Wheeler, Golden Gate University Environmental Law Journal, “COMMENT: A FEASIBLE ALTERNATIVE: THE LEGAL IMPLICATIONS OF AQUACULTURE IN THE UNITED STATES AND THE PROMISE OF SUSTAINABLE URBAN AQUACULTURE SYSTEMS,” 6 Golden Gate U. Envtl. L.J. 295, JMP)

As the United States begins to implement a variety of new aquaculture techniques in the ocean and on land, it will likely play a major role in shaping a regulatory structure that can encourage the growth of environmentally responsible aquaculture practices. Whether that development takes place on land, near the coast, or miles out to sea [\*297] will largely depend on the outcome of future legal forays and policy initiatives.

Although considerable scholarly analysis has been devoted to the environmental problems and legal complexities surrounding the development of open-ocean aquaculture, n11 little has been written on the alternative: sustainable land-based facilities. These systems are models of modern ecological engineering and can be located anywhere, including urban settings such as brownfields, n12 abandoned industrial sites, and warehouses. They can feed local populations and provide local jobs without compromising the health of our oceans and wild fish stocks. Sustainable land-based systems are already operating in American cities like Brooklyn, n13 Baltimore, n14 and Milwaukee. n15

Recirculating aquaculture systems (RAS) and aquaponic systems are closed-loop, land-based farms that re-use water and are capable of producing fish, vegetables, flowers, fruits, and herbs. n16 RAS technology eliminates the environmental problems associated with conventional aquaculture methods, such as outdoor pond systems and ocean net pen systems. RAS facilities are "sustainable, infinitely expandable, environmentally compatible, and have the ability to guarantee both the safety and the quality of fish produced." n17 Unlike conventional systems, which are limited by environmental and geographic constraints, as well as the threat of disease transference, indoor systems can produce fish in completely controlled environments without risk of escapement or spread of disease. n18 Moreover, RAS conserves heat and water through water reuse, running on ninety to ninety-nine percent less water than conventional systems and providing environmentally safe waste-management treatment. n19

[\*298] Growth and change are all but inevitable for the United States' aquaculture industry. The environmental problems associated with ocean-based operations and their traditional land-based counterparts are inexorably linked and therefore must inform both established and developing regulatory bodies of law. The current legal regimes affecting aquaculture production in the United States, in particular the federal Clean Water Act, will play a central role in shaping the development of the industry.

Sustainable, land-based aquaculture technologies, including recirculating systems, promise to provide environmentally sound aquaculture methods that are in many ways legally and economically preferable to ocean-based technologies. These systems are not only feasible, but essential to achieving an environmentally sustainable aquaculture industry. The implementation of such technologies should therefore be encouraged through the introduction of new law and policy initiatives.

### 2nc Solves Water & Land Use / Shipping Costs / Transportation Emissions \*\*\*

#### RASs are flexible --- they reduce water and land use, decrease shipping costs and fossil fuel emissions

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**\*\*\*Note --- RAS = Recirculating Aquaculture Systems**

RASs offer numerous advantages over conventional aquaculture systems. First and foremost, treating and recycling water allows both freshwater and marine RASs to reduce both water and land use substantially. Freshwater RASs may use as little as 50 liters/kilogram of produced seafood (including water use in feeds) (60).Water usage in marine RASs with artificial saltwater can be as low as 16 liters/kilogram of fish (68). In contrast, water intensity in conventional aquaculture systems ranges from 3,000– 45,000 liters/kilogram of seafood (33). Coastal marine RASs that rely on saltwater intake require almost no freshwater inputs. Owing to their low water requirements, RASs can be located on land that is unsuitable for other types of food production, such as in deserts (69), on postmining land (70), and in urban areas (71). This flexibility allows RASs to operate close to markets, reducing shipping costs and transportation-related fossil-fuel emissions (59).

### 2nc Environment Net Benefit

#### Open ocean aquaculture undermines marine environment --- fish escapes and spread of waste and chemical byproducts

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III. ENVIRONMENTAL PROBLEMS ASSOCIATED WITH AQUACULTURE

In the past decade, a new wave of industrial and governmental enthusiasm for ocean-based operations, particularly for offshore farms located in the 200-mile wide Exclusive Economic Zone (EEZ), n34 has [\*300] garnered attention as well as controversy. n35 Proponents n36 view open-ocean farms as playing a major role in solving the United States' $ 9 billion seafood trade deficit, n37 while opponents n38 warn of potentially devastating economic, social, and environmental consequences. n39

New technologies are allowing operators to cultivate fish and other seafood in exposed, open-ocean environments that were inaccessible only twenty years ago. n40 However, the rise of offshore aquaculture poses significant threats to sensitive marine environments and "represents a fundamental transition in the human claim on the Earth's surface." n41

Open-ocean aquaculture facilities operate in largely pristine areas and are intimately connected with their surrounding aquatic ecosystems. n42 Common species cultivated in the open ocean include mostly finfish such as salmon, cod, and tuna. n43 Large underwater cages are placed in the water, and as ocean currents flow through the cages, the spread of waste and chemical byproducts can implicate the health of the seafloor and the surrounding water column. n44 Escaped fish also pose a [\*301] threat to marine ecosystems by introducing non-indigenous species, compromising the genetic fitness of native populations through interbreeding, and disease translocation. n45 Disease and parasites may also spread to nearby native populations, and attempts by operators to apply drugs and chemicals to contain those threats can damage the surrounding ecosystem. n46 Predatory fish and marine mammals are also drawn to cages full of captive fish, leading to injury, death, and harassment by operators trying to protect their stocks. n47 Finally, operational failures are all but inevitable: in at least one instance, an entire fish cage broke free from a tow vessel and was sent floating adrift in the open ocean, endangering marine species as well as any ocean-going vessels unfortunate enough to cross its path. n48

Compared to the negative environmental impacts of ocean-based aquaculture facilities, the negative impacts of land-based systems are easily minimized. Unlike ocean-based operations, isolated terrestrial facilities have fewer problems with escapement. n49 The spread of disease is also easier to control because fecal matter and feed waste are not in direct contact with the surrounding marine ecosystem.

#### Sustainable land based aquaculture won’t hurt ecosystems --- operators can easily meet CWA requirements

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Because they pose little threat to surrounding ecosystems, sustainable land-based systems are generally less susceptible to environmental regulation than traditional land-based operations. For example, operators are able to exercise precise controls to meet CWA requirements, even when their facilities are adjacent to navigable waters and otherwise subject to CWA liability under Riverside Bayview and Rapanos. While conventional land-based facilities, particularly raceways and ponds, have issues with CAAP requirements or nonpoint runoff, RAS facilities can all but eradicate liability by running in a closed-loop, self-sustaining mode. These systems produce minimal amounts of effluent, and some are even able to capture effluent for other uses, such as the production of fertilizer. n172

### 2nc Environment / Disease / Fish Escape NB

#### RAS protects marine ecosystems and reduces disease outbreaks and fish escapes

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**\*\*\*Note --- RAS = Recirculating Aquaculture Systems**

Furthermore, the intensive water treatment that occurs in most RASs protects farmed fish, reduces impacts on marine ecosystems, and produces by-products that can be used by other industries. By removing waste (uneaten food, excrement, and dead bacteria), RASs improve conditions for cultured fish, enhancing feeding efficiency (59) and allowing for higher stocking densities than most aquacultural systems (60, 68). By sterilizing water before it enters the system, RASs remove pathogens and reduce the risk of disease outbreaks (59). When wastewater is sterilized as it is discharged from the system, many RASs also reduce the possibility of fish escapes and the transmission of disease and waste to the surrounding environment (59, 71). Additionally, waste solids removed from RASs are rich in both nitrogen and phosphorus and can be used as agricultural fertilizers (53, 72) or in vermicomposting (73), polychaete production (74), or methane production (75).

### 2nc Antibiotic Resistance Net Benefit

#### RAS avoids antibiotic use that spreads antibiotic resistance in marine ecosystems

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3. Antibiotic Use and FDA Guidelines

The FDA's involvement in the regulation of the aquaculture industry is quite extensive due to the continual need to treat and prevent fish disease. n157 The Center for Veterinary Medicine (CVM) is the FDA division charged with regulating the manufacture and distribution of food additives and drugs given to animals. Although the use of drugs in aquatic-based facilities raises its own array of concerns such as the [\*315] spread of antibiotic resistance in marine ecosystems, human consumption of fish treated with antibiotics may also present health hazards and thus requires extensive regulation. The CVM must approve a drug pursuant to a New Animal Drug Application (NADA) before it can be used in agriculture or aquaculture. Manufacturers must demonstrate, using specifically defined methods, that their drugs are safe and effective. n158 The FDA considers a drug "safe" if there is a "reasonable certainty of no harm to human health from the proposed use of the drug in food-producing animals." n159

While the effects of antibiotic resistance on marine life are beyond the scope of this Comment, it is worth noting that the FDA's regulation of aquaculture has come under heavy scrutiny owing to potential oversight problems regarding antibiotic approval, genetic engineering provisions, and labeling. n160 The actual prevalence of antibiotic use on fish farms is also heavily underreported. n161 Operators of sustainable aquaculture facilities, however, will have little trouble complying with FDA requirements because technologies like RAS systems have little need to use antibiotics due to the increased ability to limit the entrance of pathogens into the contained environment. Moreover, in the case of a disease event, alternative treatments are more effective in the RAS context because of the relatively small quantity of water that must be treated.

### 2nc Liability Net Benefit

#### Ocean based aquaculture will almost certainly face liability under Clean Water Act --- RAS avoids it

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In addition to limiting regulation to "navigable waters," courts may also be reluctant to apply the CWA definition of "pollutants" to aquaculture facilities. The CWA defines pollutants as "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into the water." n125 However, the CWA list of pollutants does not contain a catch-all phrase and "the list has been construed as suggestive rather than exclusive." n126

In Association to Protect Hammersley, Eld, & Totten Inlets v. Taylor Resources, Inc., the U.S. Court of Appeals for the Ninth Circuit issued a decision interpreting the term "pollutant" in the context of an aquaculture facility. n127 The plaintiff, a landowners' advocacy organization, brought suit under the CWA against a mussel facility growing mussels attached to suspension ropes anchored to the sea floor of Washington's Puget Sound. n128 The mussels matured on the ropes, feeding exclusively on the nutrients found naturally in the water. n129 The facility operator held no permit. The Ninth Circuit struck down the plaintiff's argument that a discharge of mussel feces and shell material into navigable waters constituted a "pollutant," holding instead that the emissions were not "pollutants" subject to permitting requirements. n130 The court based its analysis on a distinction between materials "altered by a human or industrial process" and those that were the result of "natural biological processes." n131

Although the Ninth Circuit held that shell and feces discharges were [\*311] not "pollutants" under the CWA, a district court within the First Circuit was willing to subject similar discharges to CWA regulation. n132 In U.S. Public Interest Research Group v. Atlantic Salmon of Maine, L.L.C., the district court held that aquaculture facilities discharging salmon feces and urine into the ocean were subject to the CWA since they were discharging "pollutants" and the salmon net pens were "point sources." n133 The court reasoned that escaped salmon, as well as salmon feces and urine, were "pollutants" under the CWA because they constituted "biological materials" or "agricultural wastes," both of which are explicitly mentioned in the statutory definition. In addition, antibiotics added to the feed qualified as "pollutants" under the "chemical waste" part of the statutory definition. n134

The disparate results in Association to Protect Hammersley and Atlantic Salmon represent a split with potentially profound impacts on aquaculture facilities located in the ocean and on land. Taken as a whole, these judicial interpretations indicate some willingness by the courts to qualify fish feces, escaped fish, and other organic discharges as "pollutants." This definition has particularly serious implications for aquaculture facilities that are not self-contained and are thus highly susceptible to escapement and fecal matter discharge. n135 Moreover, while the Ninth Circuit's limited definition excludes fecal matter, it still leaves escapement and the discharge of other potentially hazardous materials open to a "pollutant" determination. Although it is difficult to predict whether this split will be resolved, either by the Supreme Court or additional legislation, it is certain that a self-contained, highly adjustable aquaculture facility such as an RAS, will significantly decrease CWA liability in the "pollutant" context.

Meanwhile, compliance with CWA requirements are is extremely difficult for ocean and traditional land-based facilities because they are often located directly in navigable waters and can easily be subjected to "point source" NPDES permitting requirements. Although the "territorial seas" defined as "navigable waters" only extend three nautical miles seaward, courts have held that the federal EPA may issue permits and regulate discharges that occur in "all ocean waters," which includes the EEZ. n136

Ocean net-pens are particularly prone to pollution discharge from [\*312] fish in the form of waste, escapement, disease transference, or from additives such as antibiotics and feed. n137 Therefore, even the most well-intentioned ocean operator may find itself in violation of the CWA, a law that imposes both civil and criminal penalties for "knowing" or "willful" violations. n138 Moreover, as the recent closure of an oyster farm that had operated for over forty years in an estuary in Northern California illustrates, even seafood production free of CWA liability may be subject to closure if it is located in a government-protected wilderness area. n139

### --- XT: Liability Net Benefit

#### RAS also avoids liability of The Lacey Act

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2. International and Interstate Transportation: The Lacey Act

Passed in 1900 to protect wildlife from the threat of illegal commercial hunting, the Lacey Act makes it unlawful to "import, export, transport, sell, receive, acquire or purchase" any fish, plant, or wildlife "taken, possessed, transported, or sold" in violation of state, federal, or foreign law. n151 Prosecution under the Lacey Act can also be triggered by [\*314] the violation of a separate federal law such as the Endangered Species Act, thereby compounding the penalty under state permitting or environmental law. n152

Every state has established regulations pertaining to protected, prohibited, restricted, or approved exotic or game species. In California, for example, transporting dreissenid mussels without authorization is prohibited. n153 While a fine of up to $ 1000 may be issued for violating California law, n154 a person who transports dreissenid mussels across state lines may also be prosecuted under the Lacey Act, with substantially harsher penalties. Felony provisions under the Lacey Act, triggered by knowingly selling wildlife with a market value over $ 350, can result in fines of up to $ 20,000 and imprisonment. n155

The Lacey Act is a potentially significant imposition for aquaculture operators because any interstate commerce involving farmed fish or particular species of fish can carry substantial legal consequences. Sustainable aquaculture technologies are also far less susceptible to liability under the Act because locally produced fish are generally sold to nearby markets - the ideal scenario for systems located in urban areas - and will not require interstate shipping. Of course, for those fish sold interstate, steps should be taken to ensure that regulated species are not transported across state lines. n156

### RAS Waste => Ag Fertilizers / Methane Production

#### RAS wastes can be used to produce agricultural fertilizers and methane

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**\*\*\*Note --- RAS = Recirculating Aquaculture Systems**

Furthermore, the intensive water treatment that occurs in most RASs protects farmed fish, reduces impacts on marine ecosystems, and produces by-products that can be used by other industries. By removing waste (uneaten food, excrement, and dead bacteria), RASs improve conditions for cultured fish, enhancing feeding efficiency (59) and allowing for higher stocking densities than most aquacultural systems (60, 68). By sterilizing water before it enters the system, RASs remove pathogens and reduce the risk of disease outbreaks (59). When wastewater is sterilized as it is discharged from the system, many RASs also reduce the possibility of fish escapes and the transmission of disease and waste to the surrounding environment (59, 71). Additionally, waste solids removed from RASs are rich in both nitrogen and phosphorus and can be used as agricultural fertilizers (53, 72) or in vermicomposting (73), polychaete production (74), or methane production (75).

### RAS Exist Now

#### Recirculating aquaculture systems exist in small scale in U.S.

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II. A BRIEF HISTORY OF AQUACULTURE

Pioneered by the Chinese a few thousand years ago, growing and harvesting fish, crustaceans, mollusks, and aquatic plants is an ancient practice that has only recently become a booming international industry. n20 After World War II, a shift in the economic conditions of developed nations coincided with a population boom, leading to an increase in the demand for fish and shrimp. n21 Aquaculture as a large-scale commercial practice quickly developed, particularly in Asia, where over fishing and environmental degradation had caused significant declines in wild stocks. n22 In the last half-century, aquaculture has grown exponentially, with global production increasing from less than one million tons in 1950 to 52.5 million tons in 2008. n23 About half the seafood consumed around the world now comes from farms, and that percentage is likely to increase. n24 Nearly half of the world's aquaculture facilities are ocean-based; the rest are situated in freshwater ponds, [\*299] estuaries, or land-locked facilities. n25

The United States ranks thirteenth in total aquaculture production. n26 In 2010, Asia accounted for eighty-nine percent of world aquaculture production by volume. n27 In the United States, the majority of aquaculture currently occurs on land, with channel catfish representing eighty-one percent of the 287,132 tons of finfish produced in 2008. n28 Catfish production takes place in large freshwater ponds in the southeastern states of Mississippi, Louisiana, Arkansas, and Alabama. n29 Domestic catfish production peaked in 2008, with 234,000 tons valued at $ 39 million. The states of Arkansas, Louisiana, and Mississippi provide aquaculture jobs to nearly 4,000 people, representing thirty-seven percent of the nation's total direct employment in the industry. n30

In 2005, there were 2,347 farms housing 48,003 aquaculture ponds in the United States, along with 415 raceway n31 facilities and 315 farms operating non-recirculating systems including tanks, vats, and vaults. n32 By contrast, there were only 415 farms with recirculating aquaculture systems (RAS) nationwide. n33

### AT: Barriers to RAS

#### Barriers can be overcome

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**\*\*\*Note --- RAS = Recirculating Aquaculture Systems**

Overall, the most critical barriers to widespread commercial development of RASs are their low energy efficiency and the cost of waste removal. The goals to overcome these barriers include reducing energy use or the incorporation of alternative energy sources (e.g., solar and wind), removal of fine solids that reduce nitrification efficiency and water quality, improving nitrification and denitrification systems (including anammox systems that convert ammonia directly into nitrogen gas), and improving systems for the removal of phosphorus. These objectives can be achieved by altering feed inputs, improving energy efficiency, and optimizing conditions for beneficial bacterial growth (59). Other promising approaches include (a) bio-floc technology, whereby the flow rate is greatly reduced, and suspended communities of microbes, called flocs, convert toxic nutrients into biomass that can be consumed directly by fish or shrimp (reviewed in Reference 84); and (b) periphyton-based systems, whereby artificial substrates (e.g., bamboo shoots or poles) are added in a culture system to attract beneficial plant and animal organisms that remove nutrients and provide food for cultured organisms (reviewed by Reference 85).

#### Energy barriers for RAS can be overcome

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**\*\*\*Note --- SCOs = Single Cell Organisms**

One of the largest impediments to RAS technology is its energy inputs. A general conclusion from this review is that technologies that require substantial energy inputs—including RAS, offshore aquaculture, algae-based systems, and SCO-based feeds— are likely to be hampered by rising electricity generation and fuel costs. These technologies therefore remain risky from an economic and resource perspective, although innovations in integrated fuel systems could help alleviate the energy constraint. For example, renewable fuel technologies (solar, wind) could be used to power RASs; biogas emissions from RASs could be harnessed as an energy source for circulation and temperature control (68); and technological change in the biofuel industry using algae-based feedstocks could set the path for affordable production of SCOs as a healthy replacement of FO in feeds.

### AT: Hurts Environment

#### \*\*\*Note --- more ev to answer this is in the 1nc and 2nc Environment NB

#### RAS ensures safer seafood production with fewer environmental problems

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**\*\*\*Note --- SCOs = Single Cell Organisms**

THE PATH FORWARD

As shown in this review, there are a diversity of technological and management solutions available or under development to help reduce the resource constraints and environmental impacts of commercial aquaculture. We have examined the strengths and weaknesses of several promising culture systems, feed technologies, and species choices. The most viable and easily adopted solutions are those that are effective, profitable, and cause few additional problems, but no obvious technology stands out above the others. It is therefore advantageous to look at the efficacy of different solutions at meeting social goals, including food safety, pollution control, resource-use efficiency, and ecosystem protection.

Concerns regarding the safety of seafood products will likely remain or increase in the future, with consumers demanding seafood that can be guaranteed safe (22). RAS operations strive to control all aspects of production and can therefore remove or treat contaminants most effectively. Offshore and at sea IMTA operations will be the least secure in that they rely on increasingly impacted ocean environments for their water and feed sources (200). Aquaponic operations and IMTA operations also face the burden of having to demonstrate to seafood purchasers, consumers, and regulatory agencies that there is no contamination associated with using wastes from one aspect of production as inputs to another.

In striving to control all aspects of production, RASs are also able to guarantee reduced environmental impacts. All wastes can be concentrated and treated or used as an input to other production systems (e.g., agricultural fertilizer or methane generation). RASs can be built in biosecure facilities away from water bodies, allowing farms to culture faster-growing fish that are selectively bred or GM without worries of escapes and biological invasion. Although a RAS serves as a favorable technological fix, it rarely works well economically, especially for large-scale commercial systems. The costs of infrastructure, labor, management, and energy can be prohibitively high. As a result, a RAS shows more promise for highly valued species, such a sturgeon, and little promise for catfish or tilapia.

#### Clean Water Act ensures effective regulation of land based aquaculture

Wheeler, 13 --- J.D. Candidate 2013, Golden Gate University School of Law (Spring 2013, Garrett Wheeler, Golden Gate University Environmental Law Journal, “COMMENT: A FEASIBLE ALTERNATIVE: THE LEGAL IMPLICATIONS OF AQUACULTURE IN THE UNITED STATES AND THE PROMISE OF SUSTAINABLE URBAN AQUACULTURE SYSTEMS,” 6 Golden Gate U. Envtl. L.J. 295, JMP)

**\*\*\*Note --- NPDES = Clean Water Act’s National Pollutant Discharge Eliminations System permitting program, CAAP = Concentrated Aquatic Animal Production facility classification, BMP = Best Management Practice plans, BAT = Best Available Technology**

A. THE FEDERAL CLEAN WATER ACT

Although there are a host of environmental regulations governing various aspects of aquaculture operations, none is more significant than the CWA, a federal statute enacted "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." n96 The CWA implicates aquaculture operations by imposing liability on those facilities that threaten the water quality of surrounding water bodies. n97

The Act's central legal mechanism is the National Pollutant Discharge Eliminations System (NPDES) permitting program, which prohibits discharge except in accordance with the permit issued. n98 Specifically, the program regulates the discharge of pollutants from any "point source" ("discernible, confined and discrete conveyance ... from which pollutants are or may be discharged" n99) into navigable waters. n100 Furthermore, it requires that dischargers comply with technology-based n101 and water-quality-based n102 effluent limitations. While the CWA gives the EPA Administrator authority to issue permits for effluent discharges, a State may acquire permitting authority from the EPA, provided the State can ensure compliance with federal water quality limitations. n103 The NPDES program places restrictions on "quantities, rates, and concentrations of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters." n104

Aquaculture facilities, both terrestrial and ocean-based, require [\*308] NPDES permits if they meet the Concentrated Aquatic Animal Production (CAAP) facility classification. n105 In 2004, the EPA promulgated a final rule establishing water controls for CAAP facilities, which are defined as facilities that produce at least 100,000 pounds per year in flow-through, recirculating systems that discharge wastewater at least 30 days a year, or facilities that produce at least 100,000 pounds a year in net pens or submerged cage systems. n106 As of 2004, the rule applied to roughly 245 facilities. n107 The rule established effluent limitation guidelines and new source performance standards for specific types of commercial and non-commercial aquaculture operations. n108 Rather than setting numeric limits, the rule requires best management practices to control discharge, including the development of Best Management Practice (BMP) plans. n109 The rule also sets forth technology standards based on best conventional pollutant control technology (BCT) and best available technology that is economically achievable (BAT). n110

Depending on the rate and scale of development for sustainable aquaculture systems, it is possible that even large-scale RAS systems will qualify as CAAP facilities and thus be subject to NPDES permitting. n111 However, the implementation of BMP and the use of BAT can ensure highly manageable and effective regulation, encourage environmentally sound aquaculture practices, and provide clear industry management guidelines to operators. Small-scale RAS systems, on the other hand, may be free from permitting requirements altogether, depending on state jurisdiction and local permitting requirements.

The CWA distinguishes between two types of water pollution sources: "point source" and "nonpoint source." n112 "Nonpoint sources" include urban and cropland runoff, animal waste, storm sewer dischargers, construction sites, mining and logging operations, and atmospheric deposition. n113 While "point source" discharges fall under [\*309] control of the NPDES permitting program, "nonpoint sources" are subjected to far less rigorous regulation because the EPA initially deemed the regulation of runoff pollution infeasible. n114 Both ocean-based and traditional land-based systems will likely qualify as a "point source" and fall subject to NPDES permitting programs. n115 Sustainable land-based systems, in contrast, can avert point-source qualification altogether, and even those that do meet point-source requirements are more apt to conform to permit requirements because of greater operational control.

### AT: Water Pollution

#### Strategizes can effectively deal with water pollution

Howell, et. al, 14 --- PhD, Project Director of Report and Research Director for Future of Fish (1/15/2014, Colleen, Future of Fish, “Breakthrough Aquaculture: Uncovering solutions that drive ecologically sound and commercially viable models for farm-raised seafood,” <http://www.futureoffish.org/sites/default/files/docs/resources/Aquaculture_Report_FoF_2014.pdf>, JMP)

Water Pollution Excess (uneaten) feed and fecal waste contributes to nutrient loading in surrounding water, which can lead to harmful algal blooms and local dead zones where native plants and animals are no longer able to survive. With land-based systems, improper wastewater management can contaminate groundwater, local streams, and farmland. Mitigation: Suitable site selection for inland farms and the filtering of effluents can minimize freshwater pollution. In semi-open systems (flow-through or ponds), effluent treatment can be highly effective.

### AT: Water Intensive

#### Recirculating systems reduce freshwater needs

Howell, et. al, 14 --- PhD, Project Director of Report and Research Director for Future of Fish (1/15/2014, Colleen, Future of Fish, “Breakthrough Aquaculture: Uncovering solutions that drive ecologically sound and commercially viable models for farm-raised seafood,” <http://www.futureoffish.org/sites/default/files/docs/resources/Aquaculture_Report_FoF_2014.pdf>, JMP)

Water Use Land-based aquaculture is water intensive, and freshwater is an increasingly scarce resource facing growing demand. According to current estimates, freshwater shortages in the US have been declared for 36 states, and worldwide, demand for freshwater is projected to exceed supply by 40% by 2030. The site selection of new aquaculture facilities must take freshwater availability into consideration, as without proper conservation measures, land-based systems can deplete aquifers and/or can salinize groundwater—negative impacts for communities, farmland, and livelihoods. Mitigation: Recirculating systems effectively reduce the need for freshwater, though they require significant energy inputs. These systems have proven economically viable for the production of high-value species, but more work is needed to make them a realistic option for more general production.

### AT: State Permits / Regulations

#### RAS will avoid many state requirements

Wheeler, 13 --- J.D. Candidate 2013, Golden Gate University School of Law (Spring 2013, Garrett Wheeler, Golden Gate University Environmental Law Journal, “COMMENT: A FEASIBLE ALTERNATIVE: THE LEGAL IMPLICATIONS OF AQUACULTURE IN THE UNITED STATES AND THE PROMISE OF SUSTAINABLE URBAN AQUACULTURE SYSTEMS,” 6 Golden Gate U. Envtl. L.J. 295, JMP)

B. OTHER LEGAL CONSIDERATIONS FOR LAND-BASED AQUACULTURE SYSTEMS

1. State Fish Farm Permits

Although the full extent of CWA jurisdiction may be not clearly defined, most states have enacted legislation that calls for aquaculture regulation in addition to and independent of federal environmental statutes. Therefore, although the CWA NPDES permitting process may be inapplicable to some RAS systems and other sustainable technologies, state laws may apply. For example, Florida's legislature enacted the Florida Aquaculture Policy Act (FAPA) in 2005, with the intent to "enhance the growth of aquaculture in this state, while protecting Florida's environment." n140 FAPA delegates regulatory authority to the Florida Department of Agriculture and Consumer Services, charging the Department with the "duty to coordinate and assist the development of aquaculture." n141 The FAPA permitting process is relatively straightforward: an applicant must fill out a short certificate of registration, providing a property description and the location of the facility, and documentation of compliance with local rules and regulations. These regulations include best management practices and recordkeeping requirements. n142 A $ 100 annual fee must be deposited into a General Inspection Trust Fund. The statute also provides that all fish except for "shellfish, snook ... and prohibited and restricted freshwater [\*313] and marine species identified by rules of the Fish and Wildlife Conservation Commission, may be sold" by a certified producer "so long as product origin can be identified." n143 To date, there are over 900 reported aquaculture operations participating in FAPA, producing a wide range of seafood including fish, mollusks and aquatic plants. n144

Other states, such as New York and California, do not have comprehensive aquaculture laws, and no permits are required independent of environmental statutes like CWA and the National Environmental Protection Act (or corresponding state analogues). n145 However, a state agency is likely to place restrictions on the importation, transportation, and possession of certain species n146 and require registration in some circumstances. For example, California Department of Fish and Game regulations n147 require registration for all aquaculture facilities other than "animals ... maintained in closed systems for person, pet industry or hobby purposes." n148 In New York, laws pertaining to aquaculture are set out in the context of regulated activities within tidal wetlands, environmental and fishery conservation, and shellfish production permitting. n149 RAS and other closed-loop systems are likely excluded from these requirements, other than importation licenses, because they do not require the use of marine areas. n150

### AT: Offshore Aquaculture Best

#### \*\*\*Note --- ev is also in 1nc Solvency

#### Offshore aquaculture stymied by a number of factors

Klinger & Naylor, 12 --- \*Ph.D. student in Stanford's Emmett Interdisciplinary Program in Environmental and Resources, AND \*\*professor of environmental Earth system science at Stanford (Dane & Rosamond, “Searching for Solutions in Aquaculture: Charting a Sustainable Course,” <http://woods.stanford.edu/sites/default/files/files/searching%20for%20solutions%20in%20aquaculture.pdf>, JMP)

Nonetheless, offshore aquaculture systems also present significant social, economic, and ecological challenges. Land-based aquaculture is typically located on private land, but marine aquaculture is often located in public coastal waters, creating use conflicts and equity issues with other public and private users, including the privatization of historical commons (129–131). The analyses of profitability of offshore aquaculture under present conditions are mixed (127, 132–135). Offshore operations are capital intensive and have high production costs, which must be recouped in productivity or price increases if operations are to be economically viable (120, 122, 126). Investment is currently stymied by regulatory and operational uncertainties, including permitting, structural engineering, remote feeding tools, mortality retrieval systems, and communications and monitoring systems that allow operations to function offshore (120, 121, 131).

# NOAA Tradeoff Disadvantage

### 1nc NOAA DA --- Weather Satellite Scenario

#### NOAA weather satellite programs receiving increased funding now

Leone, 6/12 (Dan, 6/12/2014, “House and Senate Find Common Ground on NOAA Budget,” <http://www.spacenews.com/article/civil-space/40883house-and-senate-find-common-ground-on-noaa-budget>, JMP)

WASHINGTON — The U.S. Senate Appropriations Committee on June 5 approved a budget bill that would give the National Oceanic and Atmospheric Administration about $5.4 billion in 2015, including some $2.1 billion for its major weather satellite programs — a small increase over 2014 that is about even with the White House’s 2015 request and what House appropriators included in a competing bill approved in May.

Senate and House appropriators now seem to be more or less on the same page when it comes to the weather agency’s 2015 budget, even if they do not agree fully with the White House — or each other — on every detail.

Senate appropriators, like their counterparts in the House, agreed to give NOAA’s two major weather satellite programs the roughly $130 million boost the White House requested in March. That comes out to about $916 million for the Joint Polar Satellite System, some $95 million more than 2014, and about $981 million for the Geostationary Operational Environmental Satellite-R, roughly $39 million more than 2014. The second Joint Polar Satellite System spacecraft is slated to launch in 2017 — a testbed satellite launched in 2011 was pressed into service as the program’s first — while the next geostationary satellite would lift off in 2016.

Likewise, both Senate and House appropriators have now directed NASA to take over full development responsibility for the Jason-3 ocean altimetry satellite and the Deep Space Climate Observatory (DSCOVR), stripping NOAA management of their role in the development process, but keeping the weather agency in charge of on-orbit operations.

The House and Senate bills, however, differ on funding levels for these two projects. Senate appropriators included $25.6 million for Jason-3, a little less than the $25.7 million the White House wanted but $10 million more than the House bill includes. The Deep Space Climate Observatory would get $24.8 million under the Senate bill — $4.8 million more than the House approved and $3.5 million more than the White House requested.

#### Plan forces a tradeoff --- funding for weather satellites relies on constraints to the rest of the NOAA budget

Showstack, 12 (3/6/2012, Randy --- staff writer, Eos, Transactions American Geophysical Union, “NOAA Budget Would Boost Satellite Funding but Cut Some Key Areas,” vol. 93, no. 10, Wiley Online Library, JMP)

The White House’s proposed fiscal year (FY) 2013 budget for the National Oceanic and Atmospheric Administration (NOAA), announced on 13 February, looks favorable at first glance. The administration’s request calls for $5.1 billion, an increase of $153 million (3.1%) above the FY 2012 estimated budget. However, the increase for NOAA satellites is $163 million, which means that other areas within the agency would be slated for decreased funding, including programs within the National Ocean Service (NOS), National Marine Fisheries Service (NMFS), National Weather Service (NWS), and some NOAA education programs.

The proposed overall budget for the agency “reflects the overarching importance of weather satellites to public safety, to national security, and to the economy,” NOAA director Jane Lubchenco said at a 16 February briefing, noting that difficult choices were made regarding the budget. “Due to significant resources required for our weather satellites and the economic conditions in the country, other parts of our budget have been reduced, in some cases quite significantly,” she said. She added that the imperative to fund both the Joint Polar Satellite System (JPSS) and geostationary satellites in FY 2013 “imposes serious constraints on the rest of NOAA’s budget.”

The budget for the National Environmental Satellite, Data, and Information Service (NESDIS) would increase 8.7% to $2.041 billion. This includes full funding for the JPSS ($916.4 million, down from $924 million). In addition, funding for the Geostationary Operational Environmental Satellite–R Series (GOES-R) would increase to $802 million, up from $615.6 million. Environmental satellite observing systems would receive $123.2 million, up from $112.5 million. However, NOAA’s Climate Database Modernization Program to preserve and enhance the availability of climate and environmental data would be terminated.

Cuts Proposed for NOAA’s “Wet” Side

The NOS budget of $478.1 million (down 2.4% from FY 2012) would include $149.6 million for navigation services (trimmed from $148 million), $166.1 million for ocean resources conservation and assessment (down from $163.3 million), and $142.8 mil - lion for ocean and coastal management (a dip from $148.2 million). Lubchenco said the budget would maintain core mission functions, including funding for navigation services and marine sanctuary and coastal zone management programs. She highlighted the $24.3-million request for response and restoration capabilities, $29.5 million for the Integrated Ocean Observing System, and $11 million for NOAA competitive research. However, she said targeted losses would include the termination of navigation response teams and the coastal and estuarine land conservation pro - gram and a funding cut for mapping and charting.

Compared to FY 2012, NMFS funding would drop to $880.3 million (down 1.6%). Some areas would receive boosts, including funding for fisheries research and management ($430.1 million, up $4 million) and for improving enforcement and observer programs ($110.3 million, up $4.9 million). However, programs on the short end would include Habitat Conservation and Restoration ($36 million, down $11.3 million) and NOAA’s regional councils and fisheries com - missions ($27.3 million, down $5.1 million). Lubchenco said it is unclear what the reduction will mean for the councils. The bud - get also calls for closing the James J. Howard Marine Sciences Laboratory at Sandy Hook, N. J., a move strongly opposed by several members of the state’s congressional delegation.

The budget “is troubling due to the continued underfunding of NOAA and its ocean program,” said Jeff Watters, senior manager of government relations for the nonprofit Ocean Conservancy. “Adding to the burden of overall budget reductions, NOAA is tasked with paying for new, multibillion- dollar weather satellites, as well as managing our coasts and fisheries. As costs of the weather- related program continue to rise, there are fewer resources for NOAA’s core ocean programs. Americans shouldn’t have to choose between forecasting the weather and protecting our ocean. We need both.”

Matt Tinning, executive director of the nonprofit Marine Fish Conservation Network, applauded targeted fisheries investments in NOAA’s FY 2013 budget proposal, including additional funding for fisheries science, surveys, stock assessments, and monitoring. However, he said, “For NOAA to be forced to reallocate funds from core ocean and science programs to avoid crippling gaps in our nation’s satellite capacity is unsustainable, and we urge Congress and the White House to urgently seek a new approach to satellite funding.”

#### Sufficient funding is necessary to ensure timely deployment of JPSS satellite and avoid gaps in data coverage

Kicza, 13 --- Assistant Administrator National Environmental Satellite, Data, and Information Service at NOAA (9/19/2013, Mary E., “HEARING TITLED DYSFUNCTION IN MANAGEMENT OF WEATHER AND CLIMATE SATELLITES BEFORE THE SUBCOMMITTEES ON ENVIRONMENT AND OVERSIGHT COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES,” <http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-SY21-WState-MKicza-20130919.pdf>, JMP)

2013 GAO Review of the JPSS Program

NOAA was provided an opportunity to review the draft GAO recommendations and NOAA concurs with the five GAO recommendations for the JPSS Program reflected in that document. We will review the final report and the recommendations contained therein and will work to address them.

The recommendations include direction to:

● track the extent to which groups of satellite data users are using Suomi NPP and JPSS products and obtain feedback on these products;

● establish a complete JPSS Program integrated master schedule that includes a logically linked sequence of activities;

● address the shortfalls in the ground system and spacecraft component schedules outlined in the report;

● update the joint cost and schedule confidence level for JPSS-1, if warranted and justified after completing the integrated master schedule and addressing shortfalls in component schedules; and

● establish a comprehensive contingency plan for potential satellite data gaps in the polar orbit that is consistent with the contingency planning best practices identified in this report. The plan should include, for example, specific contingency actions with defined roles and responsibilities, timelines, and triggers; analysis of the impact of lost data from the morning orbits, and identification of opportunities to accelerate the calibration and validation phases of JPSS-1.

Refocusing the JPSS Program to a weather mission and moving content to other programs has improved our confidence on meeting the second quarter FY 2017 launch readiness date for the JPSS-1 satellite, thereby minimizing the possibility of gaps in data coverage noted in the GAO’s “High Risk” report. While there is still a risk of a gap in coverage, recent analyses and assessments have increased our confidence that we will launch JPSS-1 in the second quarter of FY 2017. This, coupled with a rigorous management regime for the Suomi NPP satellite to preserve operating life, gives us confidence that if the satellite continues to perform as expected, we will significantly reduce risk of a gap of coverage in the afternoon orbit. However, sufficient funding is required to ensure that we maintain the current acquisition schedule.

#### Gaps in coverage will wreck U.S. military readiness and damage major sectors of the economy

Conathan, 11 --- Director of Oceans Policy at American Progress (2/18/2011, Michael, “A Forecast for Disaster: Stormy Conditions Await if NOAA Funding Is Cut,” <http://americanprogress.org/issues/green/news/2011/02/18/9055/a-forecast-for-disaster/>, JMP)

Weather predictions used to be a frequent punchline but they have improved dramatically in recent years. More often than not you’ll need an umbrella if your local television channel or website of choice tells you to bring one when you leave the house. But we could take a huge step back to the days when your dartboard had a reasonable chance of outpredicting Al Roker if House Republicans have their way with the 2011 federal budget.

The House of Representatives is debating the Full Year Continuing Resolution Act (H.R. 1) to fund the federal government for the remainder of fiscal year 2011. The Republican leadership has proposed sweeping cuts to key programs across the climate change, clean energy, and environmental spectrum. They have also decided that accurate weather forecasting and hurricane tracking are luxuries America can no longer afford.

The GOP’s bill would tear $1.2 billion (21 percent) out of the president’s proposed budget for the National Oceanic and Atmospheric Administration, or NOAA. On the surface, cutting NOAA may seem like an obvious choice. The FY 2011 request for the agency included a 16 percent boost over 2010 levels that would have made this year’s funding level of $5.5 billion the largest in NOAA’s history.

Even this total funding level, however, is woefully insufficient for an agency tasked with managing such fundamental resources as the atmosphere that regulates our climate, the 4.3 million square miles of our oceanic exclusive economic zone, the ecological health of coastal regions that are home to more than 50 percent of all Americans, response to environmental catastrophes including the Deepwater Horizon oil spill, and fisheries that employ thousands of Americans and annually contribute tens of billions of dollars to the national economy.

More than $700 million of the president’s proposed 2011 increase in NOAA funding would be tagged for overhauling our nation’s aging environmental satellite infrastructure. Satellites gather key data about our oceans and atmosphere, including cloud cover and density, miniscule changes in ocean surface elevation and temperatures, and wind and current trajectories. Such monitoring is integral to our weather and climate forecasting and it plays a key role in projections of strength and tracking of major storms and hurricanes—things most Americans feel are worth keeping an eye on.

In fact, NOAA has been making great strides in hurricane tracking. The average margin of error for predicting landfall three days in advance was 125 miles in 2009—half what it was 10 years prior. This data translates into a higher degree of confidence among the public in NOAA’s forecasts, which means individuals will be more likely to obey an evacuation order. Further, since evacuating each mile of shoreline costs approximately up to $1 million, greater forecasting accuracy translates to substantial savings.

The United States needs these satellites if we’re to continue providing the best weather and climate forecasts in the world. The implications of the loss of these data far exceed the question of whether to pack the kids into snowsuits for the trip to school. The concern here is ensuring ongoing operational efficiency and national security on a global scale. In some cases it can literally become a question of life and death.

Consider the following numbers:

The $700 billion maritime commerce industry moves more than 90 percent of all global trade, with arrival and departure of quarter-mile long container ships timed to the minute to maximize revenue and efficiency. Shipping companies rely on accurate forecasts to set their manifests and itineraries.

Forecasting capabilities are particularly strained at high latitudes and shippers have estimated that the loss of satellite monitoring capabilities could cost them more than half a billion dollars per year in lost cargo and damage to vessels from unanticipated heavy weather.

When a hurricane makes landfall, evacuations cost as much as $1 million per mile. Over the past decade, NOAA has halved the average margin of error in its three-day forecasts from 250 miles to 125 miles, saving up to $125 million per storm.

Commercial fishing is the most dangerous profession in the country with 111.8 deaths per 100,000 workers. A fisherman’s most valuable piece of safety equipment is his weather radio.

When disaster strikes at sea, polar-orbiting satellites receive emergency distress beacons and relay positioning data to rescuers. This resulted in 295 lives saved in 2010 alone and the rescue of more than 6,500 fishermen, recreational boaters, and other maritime transportation workers since the program began in 1982.

Farmers rely on NOAA’s drought predictions to determine planting cycles. Drought forecasts informed directly by satellite data have been valued at $6 billion to 8 billion annually.

NOAA’s volcanic ash forecasting capabilities received international attention last spring during the eruption of the Icelandic volcano, Eyjafjallajökull. The service saves airlines upwards of $200 million per year.

NOAA’s polar-orbiting satellites are America’s only source of weather and climate data for vast areas of the globe, including areas key to overseas military operations. Their data are integral to planning deployments of troops and aircraft—certain high-atmosphere wind conditions, for example, can prohibit mid-air refueling operations.

All of these uses will be compromised if the Republicans succeed in defunding NOAA’s satellite program. At least an 18-month gap in coverage will be unavoidable without adequate funding for new polar-orbiting satellites this year. More troubling, taking an acquisition program offline and then restarting the process at a later date would lead to cost increases of as much as three to five times the amount the government would have to spend for the same product today.

So here’s the choice: Spend $700 million this year for continuous service or $2 billion to $3.5 billion at some point in the future for the same equipment and a guaranteed service interruption.

Environmental satellites are not optional equipment. This is not a debate about whether we should splurge on the sunroof or the premium sound system or the seat warmers for our new car. Today’s environmental satellites are at the end of their projected life cycles. They will fail. When they do, we must have replacements ready or risk billions of dollars in annual losses to major sectors of our economy and weakening our national security.

That’s an ugly forecast. Tragically, it’s also 100 percent accurate.

#### Readiness key to deter global conflict

Jack Spencer, 2000, Research Fellow in Nuclear Energy Policy at The Heritage Foundation's Roe Institute for Economic Policy Studies. “The Facts About Military Readiness” Sep. 15, 2k. accessed July 31, 2010 <http://www.heritage.org/Research/Reports/2000/09/BG1394-The-Facts-About-Military-Readiness//Donnie>

Military readiness is vital because declines in America's military readiness signal to the rest of the world that the United States is not prepared to defend its interests. Therefore, potentially hostile nations will be more likely to lash out against American allies and interests, inevitably leading to U.S. involvement in combat. A high state of military readiness is more likely to deter potentially hostile nations from acting aggressively in regions of vital national interest, thereby preserving peace.

## Top Level Uniqueness / Links

### Uniqueness --- Ocean Funding Cut Now

#### NOAA cutting back on ocean related programs

Eilperin, 6/17 (Juliet, 6/17/2014, “Obama will propose expanding Pacific Ocean marine sanctuary,” <http://www.ticotimes.net/2014/06/17/obama-will-propose-expanding-pacific-ocean-marine-sanctuary>, JMP)

The National Oceanic and Atmospheric Administration’s chief, Kathryn Sullivan, said her agency has focused on increasing the ability of coastal communities to cope with climate change and on monitoring how the marine ecosystem is being transformed. “Data are critical to all of it,” she said.

George Cooper, a lobbyist for the recreational fishing industry, said NOAA has made strides but still overstates the economic impact of the commercial fish industry by comparing the combined imported and domestic seafood trade to U.S. sport fishing.

Budget constraints and congressional opposition also remain obstacles for the administration. During a panel last week for Capitol Hill Ocean Week, Rep. Sam Farr, D-Calif., said NOAA might have to consider “changing its name to NAA” because of cuts to its “wet side.”

### Uniqueness --- Ocean Exploration Funding Low

#### Ocean exploration spending low now

Helvarg, 14 --- executive director of Blue Frontier, a marine conservation and policy group (4/1/2014, David, “It's no surprise we can't find Flight 370; Even now, we know so little about our oceans, and we spend so little on exploring them,” <http://www.latimes.com/opinion/commentary/la-oe-0401-helvarg-flight-370-ocean-exploration-20140401,0,6962388.story>, JMP)

Our investment in ocean exploration, monitoring and law enforcement efforts is at a 20-year low in the United States and not much better elsewhere. Our chances of quickly finding the missing Malaysian flight would have been improved if we had invested more money and effort on our planet's last great commons, with observational tools such as in-situ labs and wired benthic observatories, remote and autonomous underwater vehicles and gliders, forward-looking infrared cameras and multi-beam shipboard, airborne (and space-deployed) scanning systems, and other smart but woefully underfunded sea technologies.

### 2nc Budget Zero-Sum / AT: Plan = New Funding \*\*\*

#### Budget is zero-sum --- new programs require cuts in others

Leopold, 13 --- long-time Washington-based science and technology writer who is now working with the Policy Program here at the American Meteorological Society (4/9/2013, George, “Budget Squeeze Spurs U.S. Weather Collaboration,” <http://blog.ametsoc.org/columnists/budget-squeeze-spurs-u-s-weather-collaboration/>, JMP)

The zero-sum budget process faced by federal agencies means that “if you want something, you have to give up something else,” says Robbie Hood, director of NOAA’s Unmanned Aircraft Systems program. “Our job is to look at all these new technologies” and identify the best option.

#### Fiscal constraints force tradeoffs

Tracton, 12 (3/29/2012, Steve, “National Weather Service budget cuts misguided, misplaced,” <http://www.washingtonpost.com/blogs/capital-weather-gang/post/national-weather-service-budget-cuts-misguided-misplaced/2012/03/29/gIQAmm6qiS_blog.html>, JMP)

Important note: The explicit and publically announced budget reductions ultimately stem from tradeoffs in NOAA’s priorities by restraints imposed by the Obama Administration on all government agencies in recognition of the realities the nation’s fiscal difficulties. Given the state of U.S. politics it’s not surprising that the Administration’s FY 2013 budget proposal was deemed dead on arrival even before reaching the halls of Congress.

What ultimately emerges from Capitol Hill as the 2013 Federal Budget, which of course includes the approved version of the NOAA budget, is unknown. Actually, it’s probably more likely that only a “Continuing Resolution” will pass congress (hopefully without necessitating government shutdown) and provide – at least temporarily – a reprieve from the budget cuts being discussed.

#### National Ocean Plan proves internal budget tradeoff is normal means

Jensen, 12 (4/27/2012, Andrew, “Congress takes another ax to NOAA budget,” <http://peninsulaclarion.com/news/2012-04-27/congress-takes-another-ax-to-noaa-budget>, JMP)

**\*\*\* Note --- Mark Begich are Lisa Murkowski are Senators from Alaska**

Congress refused to fund some $27 million in budget requests for NOAA in fiscal year 2012 to implement the National Ocean Policy, but the administration released its draft implementation policy in January anyway.

Begich told the Journal when the draft implementation plan was released that fund diversion was a "main concern."

"At a time Congress is reining in spending, I think the administration needs to prioritize funding for existing services especially those which support jobs such as fishery stock assessments and the like, and not new and contentious initiatives," he said.

Murkowski called the administration's implementation plan "clear as mud" at an Appropriations Committee hearing April 19.

"It's expensive; there are no dedicated funds for agencies to follow through with the commitments that have been identified in the draft implementation plan," she said. "I have been told that the national ocean policy initiative is going to be absorbed by these existing programs, but yet the agencies haven't been able to provide me with any indication as to what work is actually going to be set aside as part of that trade-off, so it is as clear as mud to me where the administration is really intending to take this."

### Exploration Link

#### NOAA budget is increasing but still tight --- exploration is being cut to sustain other programs

Adams, 14 --- Oceans Advocate at National Resource Defense Council

(3/25/2014, Alexandra, “A Blue Budget Beyond Sequester: Taking care of our oceans,” <http://switchboard.nrdc.org/blogs/aadams/a_blue_budget_beyond_sequester.html>, JMP)

This past year was a tough year - from deep sequester cuts to a government shutdown. Our oceans definitely felt the budget crunch. After much excruciating negotiation, Congress finally passed a budget and now we are on the road to what we hope will be a saner way to govern and plan.

The President has just released his budget for Fiscal Year 2015. The National Oceanic and Atmospheric Administration (NOAA) budget can mean the difference between thriving oceans and coastal communities, or the decline in this invaluable public resource. This year’s budget signals that we will invest in protecting that resource, but by no means provides all that will be needed for the big job ahead. With half of Americans living in coastal areas, NOAA’s work means protecting our citizens and our natural resources. Moreover, with a national ocean economy that is larger than the entire U.S. farm sector in terms of jobs and economic output, keeping this economic powerhouse functioning matters to us all.

For fiscal year 2015, NOAA has proposed a budget of approximately $5.5 billion, an increase of 3.2% above the 2014 enacted funding levels, which took steps to mitigate the worst effects of sequestration but did not fund programs at the levels to which they ultimately need to be supported. This is a very modest increase, given the enormity of the agency’s task. Based on this request, there is every reason why Congress should fund the President’s Budget. Even the small increases this year recognize the agency’s critical role in feeding our nation, protecting our coastal economies and preserving our precious ocean resources.

NOAA has dual responsiblilities ranging from mapping the ocean floor to maintaining orbiting satellites for weather forecasting. And if we want to see investments in protecting coastal economies and ocean health, in addition to accurate weather data, we need to ensure that NOAA’s budget is able to support both its “wet”, ocean side, as well as the “dry” weather forecasting activities. This means funding both effective ocean, coastal, and fisheries programs, in addition to weather forecasts, warnings and satellites. The National Ocean Service (NOS), which helps us understand and protect our oceans and coasts, will need investments to continue its work. In FY 2015, NOAA requests a small increase of $20.6 million for NOS over the 2014 enacted levels.

With renewed commitment from both the Administration and communities around our nation to prepare for the impacts of a changing climate, NOAA’s budget includes programs to help our nation adapt to these changes. Some of our nation’s fishermen are on the front lines of climate impacts, as they watch more acidic waters decimate oyster harvests while fish populations shift away from their classic geographic range. Because ocean acidification is changing the very chemistry of our waters and threatening productive coastal economies, the President’s Budget has committed $15 million in funding for ocean acidification research and monitoring. Just ask any shellfish farmer and you will hear that this investment is long overdue and will help make the difference between abundant harvests and seasons without oysters to sell.

NOAA’s National Marine Fisheries Service (NMFS) is tasked with managing our ocean’s fisheries. In years past we have seen our fish stocks crash, but thanks to Congressional action in 1996 and 2006 on the Magnuson-Stevens Fisheries Management Act, stocks around the nation are now rebounding. Implementing this highly successful Act requires funding to gather accurate data on the status of our fish stocks and fishery managers to help implement programs. Funding these programs will help ensure our nations fisheries can continue to support coastal economies while filling our dinner plates for years to come. This year, NOAA is requesting nearly flat funding for NMFS compared to the FY14 enacted levels, as those provided funds for fisheries disaster assistance which are not reoccurring.

Unfortunately, some critical programs won’t get what they need this year. This year’s budget cuts funding for Ocean Exploration and Research by $7 million. This funding has supported exploration by the research vessel Okeanos of deep sea corals and other marine life in the submarine canyons and seamounts off the Mid-Atlantic and New England coasts that fisheries managers and ocean conservation groups, including NRDC, are working to protect. Even though funds are stretched, shortchanging exploration and research will lead to weaker protections for species and resources that are already under stress.

While we often think about all of the cutting edge science and data NOAA provides us, we often forget that it takes experts and assets to bring us those benefits. To address this, the budget includes an increase for NOAA’s corporate functions and agency management. From forecasting the days’ weather, to protecting our nation’s fish stocks and helping vulnerable areas prepare for climate change, NOAA can only provide us these services if it has the capacity and support it needs to fulfill its vital missions.

### Aquaculture Link

#### Offshore aquaculture is more expensive --- requires tougher infrastructure

Naylor, 6 --- Fellow at the Center for Environmental Science and Policy, Stanford University (Spring 2006, Rosamond L., “Environmental Safeguards for Open-Ocean Aquaculture,” <http://issues.org/22-3/naylor/>, JMP)

Open-ocean aquaculture encompasses a variety of species and infrastructure designs; in the United States, submersible cages are the model used for offshore finfish production. These cages are anchored to the ocean floor but can be moved within the water column; they are tethered to buoys that contain an equipment room and feeding mechanism; and they can be large enough to hold hundreds of thousands of fish in a single cage. Robotics are often used for cage maintenance, inspection, cleaning, and monitoring. Submersible cages have the advantage of avoiding rough water at the surface and reducing interference with navigation. A major disadvantage of offshore operations is that they tend to be expensive to install and operate. They require sturdier infrastructure than near-shore systems, they are more difficult to access, and the labor costs are typically higher than for coastal systems.

The economic requirements of open-ocean aquaculture suggest that firms are likely to target lucrative species for large-scale development or niche markets. In the United States, moi is produced commercially far from shore in Hawaii state waters, and experiments are being conducted with halibut, haddock, cod, flounder, amberjack, red drum, snapper, pompano, and cobia in other parts of the country. Tuna is another likely candidate for offshore development. Altogether, about 500 tons of fish are currently produced each year in submersible cages in the United States, primarily within a few miles of shore. The technology appears to have real promise, even though it is not yet economically viable for commercial use in most locations, and it is not yet deployed widely in federal waters far from shore.

#### Energy costs raise the investment cost needed for aquaculture

FAO 7

[23 April 2007, Food and Agriculture Organization of the United Nations, “Medium-term challenges and constraints for aquaculture”, <http://www.thefishsite.com/articles/260/mediumterm-challenges-and-constraints-for-aquaculture#sthash.Xwb2qlNs.dpuf>]

Even before the current global energy crisis, energy costs represented an important share of the production costs in many commercial aquaculture operations. With further intensification and the use of more sophisticated technologies, it is likely that more energy will be needed, thereby exacerbating the energy cost problem. As for land and water, aquaculture must compete with other activities for energy. To alleviate this problem, researchers around the world are seeking low-cost energy sources. More efficient pumps have been suggested as one of the options. Another is the use of recirculating systems. While recirculation requires energy, it does not need water pumped from lower levels and so is energy-efficient. Wind-powered pumps are being used on a limited scale in freshwater aquaculture in many countries, but their capital cost is high. The inability to design a low-cost high-volume pump for saltwater shrimp farming has also restricted their use. Solar-powered pumps present the same difficulties. In addition to seeking alternative sources, farmers are developing strategies and practices to reduce energy requirements. In certain culture practices, energy costs for pumping could be minimized with the combined use of bioremediation and lowdischarge, or even zero-discharge, techniques. However, more research on these techniques is required.

### Aquaculture Link --- AT: NOAA Doesn’t Act

#### \*\*\*Note --- this evidence isn’t necessary if the plan specifies the NOAA as the lead agency in charge of offshore aquaculture

#### NOAA will be responsible for administering federal aquaculture regulations

Winter, 9 (4/23/2009, Allison, “Obama admin hands offshore aquaculture oversight to NOAA,” <http://www.nytimes.com/gwire/2009/04/23/23greenwire-obama-admin-hands-offshore-aquaculture-oversig-10648.html>, JMP)

The Obama administration will develop federal aquaculture regulations, including a system that could permit offshore fish farming in the ocean waters for the first time, Commerce Secretary Gary Locke said today.

Locke addressed a Senate hearing as another Cabinet agency, the Interior Department, turned away from a controversial Bush administration proposal that would have expedited a permitting system for offshore aquaculture under the Minerals Management Service. He said the National Oceanic and Atmospheric Administration will oversee the preparation of the Obama administration's fish-farming guidelines.

In its final rule (pdf) for offshore renewable energy projects, released yesterday, Interior said it would not authorize aquaculture projects. The move is a reversal from the Bush administration's proposal, which would have opened the door for the government to fast-track offshore fish farms.

The new rule passes oversight of any deepwater fish farms to Commerce's NOAA and the National Marine Fisheries Service. But Locke made it clear today that the administration is not giving up on efforts to advance aquaculture that started under the Bush administration, although his department may take a different course.

### AT: No Link --- Plan is not NOAA

#### NOAA empirically has to play a role in implementing National Ocean Policy

Conathan & Polefka, 14 --- Director of Ocean Policy and Research Assistant at the Center for American Progress (3/6/2014, Michael Conathan and Shiva Polefka, “The Top 5 Challenges Facing the New NOAA Administrator,” <http://www.americanprogress.org/issues/green/news/2014/03/06/80920/the-top-5-challenges-facing-the-new-noaa-administrator/>, JMP)

Coordinating use of ocean space

In 2010, President Barack Obama issued an executive order establishing a National Ocean Policy. This action was the culmination of more than a decade of work, and implemented a key recommendation of the U.S. Commission on Ocean Policy established by President George W. Bush. President Obama’s policy establishes a National Ocean Council, bringing together more than two dozen federal agencies that have some jurisdiction over marine and Great Lakes activities with the goal of streamlining and coordinating the management of our ocean resources.

Government efficiency is a hallmark of the Republican Party’s political message, but rather than touting the National Ocean Policy for its gains in this regard, many conservatives have targeted it as a prime example of government regulatory overreach. They have repeatedly attached amendments to bills passing the House that block funding for activities related to the policy’s implementation. These proposals actually put NOAA’s budget at risk because many of the agency’s day-to-day programs provide data used to support initiatives of the National Ocean Policy. Most recently, Rep. Bill Flores (R-TX) successfully tacked on an amendment to the Water Resources Reform and Development Act that would prevent the U.S. Army Corps of Engineers from participating on the National Ocean Council.

While the White House Council on Environmental Quality and the Office of Science and Technology Policy are designated as co-leaders\* of the National Ocean Council, as the nation’s primary ocean management agency, responsibility for implementing the programs that fall under the National Ocean Policy defaults primarily to NOAA. If the policy is to demonstrate its true potential, NOAA will have to play a primary role in ensuring this eminently sensible collaboration remains solvent.

#### NOAA manages oceans

Conathan & Polefka, 14 --- Director of Ocean Policy and Research Assistant at the Center for American Progress (3/6/2014, Michael Conathan and Shiva Polefka, “The Top 5 Challenges Facing the New NOAA Administrator,” <http://www.americanprogress.org/issues/green/news/2014/03/06/80920/the-top-5-challenges-facing-the-new-noaa-administrator/>, JMP)

**\*\*\*Note --- Dr. Kathryn Sullivan is the new administrator of the National Oceanic and Atmospheric Administration**

Conclusion

Dr. Sullivan faces enormous challenges as she assumes control of an agency tasked with tracking the complex phenomena of the atmosphere and with managing America’s ocean spaces—which cover an area larger than the country’s entire landmass. Let’s hope the unique perspective she gained observing our planet from the distant reaches of outer space will provide her the vision to rise to the occasion.

## Weather Satellite Specific

### 2nc Uniqueness --- Satellite Funding Now

#### Weather satellites are fully funded now --- were shielded from sequestration

Leone, 14 (4/28/2014, Dan, “Profile | Mary Kicza, Assistant Administrator for Satellite and Information Services, U.S. National Oceanic and Atmospheric Administration,” <http://www.spacenews.com/article/features/40378profile-mary-kicza-assistant-administrator-for-satellite-and-information>, JMP)

Thus NOAA’s two main weather satellite development programs — the Geostationary Operational Environmental Satellite (GOES)-R and Joint Polar Satellite System (JPSS) — were fully funded in the omnibus spending bill that passed in December and covers federal activities for the remainder of 2014. What’s more, Congress tried to shield these efforts from sequestration, the across-the-board spending cuts that affected virtually all other federal activities beginning in March 2013.

### 2nc Uniqueness --- Satellite Development on Schedule

#### JPSS Satellite development is progressing on time --- meeting important milestones

Konkel, 6/13 (Frank, 6/13/2014, “Next-Gen NOAA Satellite One Step Closer to Launch,” <http://www.nextgov.com/technology-news/2014/06/more-wins-next-gen-noaa-satellite/86464/>, JMP)

Instrument development for the National Oceanic and Atmospheric Administration’s next-generation polar-orbiting environmental satellite continues to meet milestones on time.

This week, the second of five state-of-the-art instruments that will fly aboard the $11 billion Joint Polar Satellite System completed its pre-shipment review, which means the Ozone Mapping Profiler Suite is ready for integration with the actual satellite.

The instrument, developed by Ball Aerospace and Technologies Corporation, is scheduled for JPSS-1 integration in early 2015. The satellite itself is scheduled to launch in early 2017, and will fill a critical need for NOAA as its aging crop of polar-orbiting environmental satellites are at the end of their life expectancies.

OMPS’ timely maturation, as well as a recent successful review of another JPSS-1 instrument called the Clouds and the Earth’s Radian Energy System, has helped keep JPSS-1 on schedule to meet the 2017 launch date.

“OMPS is the next JPSS-1 instrument to pass this major milestone for the JPSS program,” said Harry Cikanek, JPSS director. “We are pleased that OMPS is right on schedule. With two done and three to go, JPSS-1 is on track for success.”

As 2017 nears, the JPSS-1 launch date becomes more critical, as Government Accountability Office reports have publicly stated an interval in polar-orbiting weather satellite coverage of 17 to 54 months is possible. Such a gap would dramatically affect short- and mid-term weather forecasting.

### AT: Sequestration = Cuts

#### JPSS and GOES were shielded from sequestration

Leone interviewing Kicza, 14 --- who has been in charge of the NOAA’s satellite division since 2007 (4/28/2014, Dan Leone, Mary Kicza, “Profile | Mary Kicza, Assistant Administrator for Satellite and Information Services, U.S. National Oceanic and Atmospheric Administration,” <http://www.spacenews.com/article/features/40378profile-mary-kicza-assistant-administrator-for-satellite-and-information>, JMP)

The JPSS and GOES programs were shielded from sequestration in 2013, but the rest of NOAA’s satellite division budget took a hit. How did you absorb that?

Just like everybody in the federal government, we went through sequestration in 2013. Additionally, we had rescissions in 2013 that we dealt with. Originally, we had plans in the 2013 budget to launch a satellite called Polar Free Flyer as part of JPSS. But in order to protect the JPSS launch we took money out of planned activities for Polar Free Flyer.

### AT: Gaps in Coverage Coming

#### \*\*\*Note --- there is more ev to answer this argument in the 2nc Stable Funding Key block

#### NOAA working to avoid gaps in coverage --- its implementing recommendations from experts

Kicza, 13 --- Assistant Administrator National Environmental Satellite, Data, and Information Service at NOAA (9/19/2013, Mary E., “HEARING TITLED DYSFUNCTION IN MANAGEMENT OF WEATHER AND CLIMATE SATELLITES BEFORE THE SUBCOMMITTEES ON ENVIRONMENT AND OVERSIGHT COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES,” <http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-SY21-WState-MKicza-20130919.pdf>, JMP)

Over the past year, we were reviewed by David Powner’s team, the Information Technology Team, at the GAO, the Department of Commerce Office of Inspector General (OIG), and independent review teams comprised of eminent aerospace experts. While the reviews looked at many specific areas of concern, all reviews urged us to remain focused on maintaining the continuity of our observational capability and being prepared to mitigate the impacts of a gap in coverage. The reviewers were mindful of the immediate and devastating impacts to the Nation that a gap in coverage would bring, starting with degraded forecast quality and skill, which could place lives and property at risk from severe weather events. We concur with the recommendations from these groups and are working to ensure the GOES-R Series and JPSS satellite development continues. The Committee has expressed concern that GAO added NOAA’s satellite acquisition of the GOES-R Series and JPSS Programs to its Biennial High Risk List due to the risk of gaps in weather observations. The steps that NOAA has been taking over the years to implement the OIG and GAO recommendations, and will take to implement these most current recommendations will address many of the root causes that the GAO High Risk report emphasized, specifically, the potentials for gaps in coverage and the impact on weather forecasts and on the customers and users of NOAA’s satellite data. Additionally, the 2012 Independent Review Team (IRT) led by Thomas Young also provided invaluable recommendations that informed NOAA’s FY 2014 Budget request and underscored the importance of refocusing the JPSS Program on a weather mission.

### AT: Gaps in Coverage Now / NOAA-16 Satellite Retired

#### Retirement of NOAA-16 satellite won’t result in data gap

Rose, 6/10 (Carrie, 6/10/2014, “NOAA retires NOAA-16 polar satellite after historic run,” <http://wtvr.com/2014/06/10/noaa-retires-noaa-16-polar-satellite-after-historic-run/>, JMP)

WASHINGTON, DC (NOAA) – After more than 13 years of helping predict weather and climate patterns and save lives in search and rescue operations, NOAA announced Monday, June 9, 2014 it has turned off the NOAA-16 Polar-Orbiting Environmental Satellite (POES). It was one of NOAA’s longest operating spacecraft, which have a planned lifespan of three to five years.

NOAA-16 was launched in 2000 and replaced by NOAA-18 as the primary POES satellite in 2005. The shutdown will result in no data gap, as NOAA-16 was being used as a back-up satellite.

NOAA will continue operating multiple POES spacecraft – NOAA-15, NOAA-18 and NOAA-19 – in addition to Suomi NPP, which is now NOAA’s primary operational polar satellite. NOAA’s POES spacecraft fly a lower, pole-to-pole orbit, capturing atmospheric data from space that feed NOAA’s weather and climate prediction models.

The deactivation process of NOAA-16 started this morning, with the final shut down occurring Monday (June 9, 2014) at 10:20 a.m. EDT. Launched in September 2000, NOAA-16 made 70,655 successful orbits of the globe, traveling more than 2.1 billion miles, while collecting huge amounts of valuable temperature, moisture and image data.

“NOAA-16 helped our forecasters detect the early stages of severe weather from tornadoes and snow storms to hurricanes, including the busiest hurricane season on record – 2005,” said Mary Kicza, assistant administrator of NOAA’s Satellite and Information Service. “NOAA-16′s long life is a credit to the engineers, who built and operated it and the technology that sustained it. Although NOAA-16 is retired, we still operate a dependable, robust fleet of satellites that continue to provide crucial data.”

### 2nc Uniqueness / Internal Link

#### Funding now for weather satellite upgrades --- money is coming from other core NOAA ocean missions

Conathan & Polefka, 14 --- Director of Ocean Policy and Research Assistant at the Center for American Progress (3/6/2014, Michael Conathan and Shiva Polefka, “The Top 5 Challenges Facing the New NOAA Administrator,” <http://www.americanprogress.org/issues/green/news/2014/03/06/80920/the-top-5-challenges-facing-the-new-noaa-administrator/>, JMP)

Today, the Senate confirmed the appointment of Dr. Kathryn Sullivan to be the new administrator of the National Oceanic and Atmospheric Administration. She replaces Dr. Jane Lubchenco, who stepped down in February 2013. Sullivan’s background—a Ph.D. in geology, a career as an astronaut that included more than three weeks in space, and service as an oceanographer in the U.S. Naval Reserve—is ideally suited to the challenge of leading the agency responsible for the management of America’s oceans, fisheries, and the National Weather Service.

Yet despite her ample qualifications and obvious acumen, she may well look back and find that training for her space walk was easier than preparing to take the helm of NOAA. By any estimation, NOAA faces massive challenges, from the sequestration-worsened budget crunch crimping the entire federal government’s ability to carry out its congressional mandates, to the global climate crisis, to fishery management dilemmas threatening one of the nation’s oldest commercial industries.

In no particular order, here are five of the biggest issues facing the incoming NOAA administrator.

Rebalancing the NOAA portfolio

It’s no surprise to anyone that federal agencies have felt the budget pinch in recent years. NOAA is no exception, though its financial circumstance may not be as dire as some other agencies’—at least on the surface. For 2013, NOAA’s topline spending level held relatively steady from fiscal year 2012 at about $4.9 billion. But the distribution of its funding has created difficult circumstances for many of its traditional programs.

In FY 2010, the last year Congress passed an appropriations bill other than a continuing resolution, NOAA’s spending was set at about $4.7 billion, with $3.4 billion going to its core functions of operations, research, and facility maintenance and $1.3 billion supporting procurement and acquisition (in layman’s terms, this means “buying stuff”). More than 90 percent of that acquisition budget—$1.2 billion—was spent on upgrading NOAA’s aging weather satellite systems. Fast forward to the 2013 spend plan, and the operations budget has declined to $3.1 billion, while the acquisitions budget has actually increased to $1.8 billion—$1.7 billion of which funded the purchase and construction of new satellite systems.

While there’s no question that the government desperately needs to upgrade its weather satellite systems, we can’t continue to take this funding away from core missions such as fishery and marine protected species management, ocean observation and monitoring, and pollution response.

Modernizing the National Weather Service

Of course, rebalancing the agency’s priorities doesn’t mean neglecting the critical upgrades and maintenance of services in the National Weather Service and the National Environmental Satellite, Data, and Information Service—the rather wordy name of NOAA’s office in charge of its space observation operations. Extreme weather events are becoming increasingly frequent, destructive, and costly. In 2011 and 2012 alone, extreme weather events caused $188 billion in damages that disproportionally affected lower- and middle-income Americans.

NOAA has made great strides in hurricane prediction capabilities during the past two decades, particularly when it comes to predicting the path that the storms will follow. In addition to saving lives, these investments have led to real cost reductions. For example, improved landfall forecasting means smaller evacuation zones and evacuation costs roughly equal to $1 million per mile. Similar improvements in hurricane intensity forecasting and tornado predictions could pay similar dividends. In 2012 and 2013 alone, tornados killed 119 people in the South and Midwest, including two massive twisters that claimed 26 lives in Oklahoma on May 19–20. We can and must continue to improve our capacity to save lives and safeguard property.

### 2nc Link Block

#### Costly NOAA satellite programs have required reductions in other ocean policies

Representative Smith, 14 (4/30/2014, Rep. Smith, Lamar - (R-TX), Congressional Documents and Publications. House Science, Space, and Technology Subcommittee on Environment Hearing - "An Overview of the National Oceanic and Atmospheric Administration Budget Request for FY2015," Factiva, JMP)

Meanwhile the chronic cost over-runs of NOAA's satellites have forced significant reductions in funding for important activities in areas such as oceans, fisheries, and weather.

#### ( ) Cuts to ocean and fishing programs have been critical to fund weather satellites --- full funding is key to keep the program on track

Morello, 12 (3/21/2012, Lauren, “Soaring Satellite Costs Spur U.S. Government to Seek Budget Cuts; NOAA's ambitious plans for new satellites are consuming more of the agency's budget, prompting questions from lawmakers,” <http://www.scientificamerican.com/article/soaring-satellite-costs-spur-us-government-to-seek-budget-cuts/>, JMP)

The spiraling cost of satellite programs at the National Oceanic and Atmospheric Administration has lawmakers from both parties sniffing around for a strategy to trim the agency's budget.

But there are no easy options to cut satellite spending and ensure the quality of weather forecasts and warnings to which Americans are accustomed, Obama administration officials said yesterday.

The White House's fiscal 2013 budget request seeks $5.1 billion for NOAA -- a request that amounts to a slight increase over current spending, but one that balances growing satellite costs with cuts to weather, oceans, fisheries and research programs.

It's a necessary evil, Commerce Secretary John Bryson told members of the House Appropriations subcommittee that handles NOAA's budget.

"I believe we have to put full priority in the satellite programs," he said. "National security is absolutely at stake."

NOAA Administrator Jane Lubchenco sounded a similar line during her subsequent appearance before the Commerce, Justice and Science appropriations panel.

"Satellites are expensive," she said. "We have tried to make a lot of tough choices, but in light of the importance of these satellites to provide weather warnings, disaster warnings, we believe they are vitally important."

An unwelcome message

That was an unwelcome message for lawmakers like Rep. Norm Dicks (D-Wash.), the ranking member of the full House Appropriations Committee.

"Just a few years ago, in [fiscal] 2010, satellite procurement represented just over 25 percent of the NOAA budget. In this [fiscal] 2013 proposal, that jumps to 36.6 percent," he said. "This situation seems unsustainable."

Pennsylvania Democrat Chaka Fattah suggested that NOAA's satellites were "eating at other needed services."

Subcommittee Chairman Frank Wolf (R-Va.) repeatedly compared NOAA's Joint Polar Satellite System, which accounts for a hefty percentage of the agency's current satellite budget, to NASA's troubled James Webb Space Telescope, years behind schedule and well over its original budget.

But Lubchenco told lawmakers that the data that will be collected by JPSS is crucial for accurate weather forecasts and warnings -- and it is not available from any other source.

"There is no backup," she said.

NOAA has committed to cap JPSS's overall cost at $12.9 billion, she said, but keeping the program on track would require Congress to award the agency the full $916 million it is seeking for the satellite effort in fiscal 2013.

#### ( ) Budget pressures put weather satellites on chopping block --- triggers longer data coverage gaps

Gillis, 11 (4/14/2011, Justin, “Weather Satellites on the Chopping Block,” <http://green.blogs.nytimes.com/2011/04/14/weather-satellites-on-the-chopping-block/?_php=true&_type=blogs&_php=true&_type=blogs&_r=1>, JMP)

As my colleagues Eric Lichtblau, Ron Nixon and I report in summary form in Thursday morning’s paper, the budget deal moving through Capitol Hill slashes funds that the Obama administration requested for a satellite program considered vital for the nation’s weather forecasting. That raises the prospect of less accurate forecasts and other problems, some of them potentially life-threatening, starting in 2016.

Jane Lubchenco, head of the National Oceanic and Atmospheric Administration, warned at a Senate hearing on Wednesday that the cutbacks would probably lead to a serious gap in satellite data, undermining National Weather Service forecasts.

Research by her agency suggests that without the type of capability that the proposed satellites were expected to provide, the weather service might fumble forecasts of future events similar to the huge snowstorms that hit Washington and New York the last two winters.

“It’s a big risk,” said Daniel Sobien, head of the union that represents government weather forecasters.

Forecasters would still have access to data from satellites not affected by the cutbacks, but those would offer less detailed coverage of the country, which is why the weather forecasts would become less accurate.

The potential coverage gap would be limited to 18 months or so — but only if Congress agreed to restore as much as $1 billion in funds needed for the satellite program in the budget year that begins in October. Many people on Capitol Hill, including some Republicans, support doing that, but given the pressures on the budget and the political tensions over federal spending, that is by no means a certainty. So the situation raises the prospect of a deterioration in weather forecasts that might last for years.

Dr. Lubchenco warned that even if Congress restarted the program, the government would probably wind up spending $3 or $4 for every dollar saved by halting it this year. “We have to cancel the contracts — we have to let people go,” she said. “These are very sophisticated, skilled workers. Then you need to bring the programs back up.”

#### ( ) Over-prioritizing immediate needs forces a tradeoff --- NOAA weather investments are key to ensure continued economic growth

Lubchenco, 12 --- Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator (2/13/2012, Dr. Jane Lubchenco, “Statement from Dr. Jane Lubchenco on NOAA’s FY 2013 Budget Request,” <http://www.noaanews.noaa.gov/stories2012/20120213_budget_statement.html>, JMP)

Americans today face challenging economic times. Families are sitting down at their kitchen tables and making tough choices with tighter budgets. Businesses are weighing whether to hire new employees or expand operations. Communities are challenged to determine which essential services to provide to their citizens and businesses. Across the country, we are forced to balance between immediate needs and future investments.

Everyone has to share in the collective effort to reduce the deficit. At NOAA, we too are facing the tough choices of how best to balance the national priorities in science, service and stewardship entrusted to NOAA, while at the same time living within our means. We will still strive to deliver on core missions that Americans have come to depend on each and every day by providing the best information for life and safety, ensuring healthy and productive ecosystems in our oceans and coastal areas, and continuing important research and development. And we will redouble our efforts to make disciplined choices and smart investments, and to seek out new partnerships whenever possible.

This year’s budget request of approximately $5.1 billion aims to (1) provide immediate life-saving and job-supporting services needed to prepare and protect American communities and infrastructure and (2) invest in science and research that will enhance America’s competitiveness. It reflects a continued commitment to stewardship of coastal and ocean resources, which in turn benefits coastal economies. It includes tough choices and sacrifices made in the face of tightening budgets, with valuable programs reduced or terminated to accommodate critical investments that could not be delayed to ensure we can meet national priorities.

Services that save lives and help businesses succeed

NOAA’s services save lives and protect livelihoods. Last year (2011) rewrote the record books on extreme events. From crippling snowstorms to the second deadliest tornado year on record, to epic floods, drought and heat and the third busiest hurricane season on record, we’ve witnessed the extreme of nearly every weather category. These events provided a sobering reminder about our vulnerability to the impacts of extreme weather and climate. This budget allows NOAA to improve severe weather warnings by producing and delivering forecasts that Americans have come to trust, provide services in a cost-effective manner, and continue to reduce weather-related fatalities. This budget also provides for continued timely advancement of the nation’s next-generation weather satellites.

Healthy environment and a healthy economy

NOAA’s stewardship responsibilities support coastal economies and provide tourism opportunities, storm protection, safe energy, and recreational and commercial fishing – integral facets of our economy at large. This budget allows us to maintain some of the core stewardship programs that our nation’s coastal communities have come to rely on, such as sustainable fisheries, marine sanctuaries and coastal management. We will work tirelessly to enhance our partnerships and find innovative solutions to conserve and protect our ocean and coastal resources.

Investing in science today for a better tomorrow

Science is at the heart of NOAA’s services and stewardship. A more accurate hurricane track forecast today is the result of smart research investments of the past. Putting America’s fishing industry on a sustainable and profitable path depends on investments in the best fisheries science. NOAA’s science enhances our understanding of and ability to predict changes in the Earth’s environment, an increasingly crucial role given the economic and environmental challenges we face. NOAA is making key investments in the next generation of research and informational products to protect our environment, enhance our security, and spur economic recovery. This budget provides necessary investments to improve our understanding of climate processes and support research that will help fuel a clean energy economy.

We must remember the significant contribution NOAA makes to growing a strong economy that is built to last. Just as every citizen depends on NOAA for his or her weather information, from the five-day forecast to life-saving weather alerts, so too do businesses rely on NOAA. Fishermen trust NOAA’s nautical charts and check tides and currents information before heading to sea. Farmers depend on our long-range forecasts to determine what crops to plant and when. Using NOAA services, airlines save millions of dollars by keeping planes and personnel from being stranded in bad weather. Marine shipping companies, which transport 90 percent of the goods into and out of the United States, rely on NOAA to keep our ports operating safely. For coastal communities, NOAA’s stewardship of our fisheries, coasts and oceans is vital to their prosperity. And the list goes on and on. It is hard to imagine a sector of the economy that does not depend on NOAA in some way or another.

NOAA is in our communities. Our employees are your colleagues, neighbors and friends. As individuals and as an agency, we are partners in the success of families, businesses and communities. This budget keeps our commitment to deliver the services, the stewardship, and the smart investment in the science that America needs.

#### ( ) Increased funding for weather satellites requires cuts or continued constraints on other programs

Tracton, 12 (3/29/2012, Steve, “National Weather Service budget cuts misguided, misplaced,” <http://www.washingtonpost.com/blogs/capital-weather-gang/post/national-weather-service-budget-cuts-misguided-misplaced/2012/03/29/gIQAmm6qiS_blog.html>, JMP)

The NOAA fiscal year 2013 budget request (page 7), included in the Obama Administration’s submission to Congress, calls for more than $2 billion dollars for the agency’s weather satellite programs, an increase $163 million from 2012. Not surprisingly, the increase means other areas within NOAA are slated for decreased funding. Of interest here is that the President’s 2013 budget for the National Weather Service (NWS) reduces funding by $36.4 million in operations and research (page 4-63)

Is there something wrong with this picture of enormous investments for satellites at the expense of relatively miniscule costs of valuable components of NWS’s operational mission? In the opinion of many, including myself, the answer is a confident yes.

One striking way to look at this is to note that $2 billion for weather satellites is more than twice that of the entire NWS ($972 million)! Moreover, the casualties of the 2013 budget cuts are just the tip of the iceberg of implicit budget constraints (not actual cuts) imposed for years by satellite programs on other promising and much less costly programs within the NWS.

### 2nc Balanced Portfolio Internal Link

#### NOAA has to maintain its balanced investments across NOAA missions --- observation and monitoring key to natural disaster preparation and mitigation

Woglom, 13 --- Vice President, Conservation Policy and Programs, for Ocean Conservancy (7/9/2013, Emily, “Three Questions to Ask About NOAA’s Funding,” <http://blog.oceanconservancy.org/2013/07/09/three-questions-to-ask-about-noaas-funding/>, JMP)

2. Is there balance between NOAA’s wet and dry missions?

NOAA has been tasked with a broad range of duties, from the National Weather Service and weather satellite programs (dry side) to the National Ocean Service and ocean and coastal programs (wet side).

Congress must maintain balanced investments across NOAA’s missions. Americans shouldn’t have to choose between weather satellites and ocean and coastal resources that support and protect our coastal economies and communities. We simply need both.

One example of the importance of NOAA’s “wet side” programs is the role they play in disaster preparedness and mitigation. Coastal wetland buffer zones in the United States are estimated to provide $23.2 billion per year in storm protection, and a single acre of wetland can store 1 to 1.5 million gallons of floodwaters or storm surge.

In addition, ocean and coastal observations and monitoring supports severe storm tracking and weather forecasting systems, which greatly reduce the cost of natural disaster preparation, evacuation and mitigation. We know that disasters, both natural and man-made, will strike our shores again. Let’s ensure we’re better prepared.

### 2nc Stable Funding Key \*\*\*

#### Stable and predictable funding is key to meet satellite development milestones --- prevents gaps in coverage

Kicza, 13 --- Assistant Administrator National Environmental Satellite, Data, and Information Service at NOAA (9/19/2013, Mary E., “HEARING TITLED DYSFUNCTION IN MANAGEMENT OF WEATHER AND CLIMATE SATELLITES BEFORE THE SUBCOMMITTEES ON ENVIRONMENT AND OVERSIGHT COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES,” <http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-SY21-WState-MKicza-20130919.pdf>, JMP)

Over the past five years, NOAA has made strategic and deliberate steps to return to an over 40 year partnership with NASA for acquisition of NOAA’s operational satellites. This renewed partnership leverages the acquisition and developmental expertise of NASA to provide systems engineering and procurement support on a fully reimbursable basis. This decision continues a partnership that has supported an unprecedented series of successful launches of NOAA’s geostationary and polar-orbiting operational satellites and enables in-depth technical management and systems engineering oversight of NOAA’s satellite acquisition portfolio.

I am pleased to report this partnership continues to enable us to stabilize management structures, staffing, requirements, and program oversight. This has led to the completion of key program milestones, and gives us confidence that we will meet the cost, schedule, and performance milestones that lie ahead.

Our recurring challenge is being able to plan and execute our programs in the difficult budget environment we all face at this time. This requires the timely receipt of appropriated funds of the requested amounts, allowing these critical satellite systems to maintain their current development cadence, thereby ensuring the GOES-R Series and JPSS satellites are successfully launched and operating before the current legacy satellites cease to provide useful data. Without this, NOAA cannot guarantee that cost, schedule, and performance commitments can be met.

#### Stable funding is critical to prevent gaps in data coverage

Kicza, 13 --- Assistant Administrator National Environmental Satellite, Data, and Information Service at NOAA (9/19/2013, Mary E., “HEARING TITLED DYSFUNCTION IN MANAGEMENT OF WEATHER AND CLIMATE SATELLITES BEFORE THE SUBCOMMITTEES ON ENVIRONMENT AND OVERSIGHT COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES,” <http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-SY21-WState-MKicza-20130919.pdf>, JMP)

Conclusion

I will conclude by reaffirming that the NOAA-NASA partnership is strong and is supporting the good progress that the GOES-R Series and JPSS Programs are making. Stability of funding in FY 2014 and beyond is critical for meeting developmental milestones that will allow these programs to meet their launch dates. NOAA shares the concern of the Congress that gaps in coverage would significantly impact our ability to provide the weather coverage that the American public and commerce rely on. NOAA and the Department of Commerce thank the GAO for the very important contributions they are making to these programs. Mr. Powner and his team’s recommendations offer us the opportunity for continuous improvement as we move forward to maintain the continuity of the operational environmental satellites that are so crucial to protecting American lives and property. Further, we express our appreciation to the members of the IRT and the OIG staff who have also provided significant and valuable review and recommendations. We accept their recommendations and will be responsive to them.

Finally, I wish to say that NOAA values the long-standing interest by the Committee and its staff regarding NOAA’s satellite program. We understand the difficult fiscal environment that we find ourselves in and appreciate the Congressional support to ensure that these critical national programs are supported to the maximum extent possible. I am happy to answer any questions you may have.

#### Continued funding critical to timely launch of new weather satellites

Kicza, 13 --- Assistant Administrator National Environmental Satellite, Data, and Information Service at NOAA (9/19/2013, Mary E., “HEARING TITLED DYSFUNCTION IN MANAGEMENT OF WEATHER AND CLIMATE SATELLITES BEFORE THE SUBCOMMITTEES ON ENVIRONMENT AND OVERSIGHT COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES,” <http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-SY21-WState-MKicza-20130919.pdf>, JMP)

We are cognizant that each day is a day closer to the eventual retirement of the current legacy satellites: the GOES-N Series, NOAA-19 and the NASA research satellites. This reality underscores the urgency that we must maintain the current development schedule to ensure that the first JPSS satellite is launched no later than the second quarter of FY 2017.

We rely on your continued support to ensure that these critical programs are fully funded in FY 2014 and beyond.

#### Funding shortfalls empirically trigger delays that risks gaps in weather coverage

Broun, 13 --- Chairman of the Oversight Subcommittee (9/19/2013, Paul, “Statement of Oversight Subcommittee Chairman Paul Broun (R-Ga.), Hearing on Dysfunction in Management of Weather and Climate Satellites,” http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-%20SY21-WState-B001262-20130919.pdf, JMP)

The GOES-R program is further along than JPSS, but it too is facing a potential data coverage gap. It is my understanding that NOAA expects to retire one of its operational satellites, GOES-13, and move the back-up, GOES-14, into operation in April 2015. That means for at least six months, there will be no backup satellite, assuming GOES-R is launched in October 2015. Recently, however, program officials acknowledged that the launch date will likely slip by one quarter, which could result in a delay of as much as six months. And the cause for the delay? A $54 million sequester cut, according to NOAA staff.

### 2nc Key to NOAA Effectiveness

#### NOAA satellite data is key to weather forecasts and overall agency effectiveness

Kicza, 13 --- Assistant Administrator National Environmental Satellite, Data, and Information Service at NOAA (9/19/2013, Mary E., “HEARING TITLED DYSFUNCTION IN MANAGEMENT OF WEATHER AND CLIMATE SATELLITES BEFORE THE SUBCOMMITTEES ON ENVIRONMENT AND OVERSIGHT COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES,” <http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-SY21-WState-MKicza-20130919.pdf>, JMP)

Good morning Chairmen Stewart and Broun, Ranking Members Bonamici and Maffei, and Members of the Committee. I am Mary Kicza, the Assistant Administrator of NOAA’s National Environmental Satellite, Data, and Information Service (NESDIS). Thank you for the opportunity to join Mr. David Powner from the Government Accountability Office (GAO), and Mr. Marcus Watkins from the National Aeronautics and Space Administration (NASA) at today’s hearing. While I will focus my remarks on NOAA’s Joint Polar Satellite System (JPSS) and Geostationary Operational Environmental Satellite-R (GOES-R) Series Programs, I am ready to address questions on NOAA’s entire satellite acquisition portfolio.

NOAA’s mission to provide science, service, and stewardship to the Nation is fundamentally dependent on observations of our environment. These observations are the backbone of NOAA’s predictive capabilities. NOAA must ensure operational weather, ocean, climate, and space weather data are available seven days a week, 24 hours a day, to address our Nation’s critical needs for timely and accurate forecasts and warnings of solar storms and severe weather, such as hurricanes, flash floods, tsunamis, winter storms, and wildfires. Of the data actually assimilated into NOAA’s National Weather Service (NWS) numerical weather prediction models that are used to produce the longer term weather forecasts three days and beyond, over 95 percent comes from satellites, of which over 80 percent are from polar-orbiting satellites. These polar-orbiting satellites include NOAA’s Polar-orbiting Operational Environmental Satellite (POES), Suomi National Polar-orbiting Partnership (Suomi NPP) satellite, and NASA Earth Observing Satellites (EOS) in the afternoon orbit, and the European Metop satellites which fly in the mid-morning orbit. GOES satellites, along with Doppler Radar, assist operational weather forecasters with current and short-term forecasting abilities (i.e., weather that is occurring now up to three days in the future) and severe weather warning forecasts.

The American public and the commercial sector expect that they can continue to rely on receiving accurate, reliable, and timely weather information from NWS. The growing private weather sector, which delivers specialized weather information, is another consumer reliant on receipt of these data. NOAA’s satellites are an integral part of the observational infrastructure that supports these NWS and commercial sector forecasting capabilities.

#### Satellite data key to protect coastal and ocean resources

Davis, 11 --- director of satellite operations at the NOAA (June 2011, Gary, “History of the NOAA Satellite Program,” <http://www.osd.noaa.gov/download/JRS012504-GD.pdf>, JMP)

1. Introduction

The National Oceanic and Atmospheric Administration’s (NOAA) satellite program has stood watch over the American public and partner nations for more than four decades developing and applying space based Earth remote sensing for NOAA’s National Weather Service (NWS) forecasts. The NWS is responsible for weather warning services (the geostationary satellites) and their global forecasts (the polar program). NOAA’s satellite operations grew out of the early space program and the desire to study our Earth from a vantage point high in the sky. Over the past half century, NOAA's satellites have evolved from weather satellites to environmental satellites. Data is used for applications related to the oceans, coastal regions, agriculture, detection of forest fires, detection of volcanic ash, monitoring the ozone hole over the South Pole, and the space environment. As NOAA has evolved from weather only sensing to environmental sensing, it has aligned about strategic themes. Current and future generations of satellites support all of the NOAA’s strategic goals.

. Protect restore and manage the use of coastal and ocean resources through an ecosystems approach to management

. Support society’s needs for weather and water information

. Understand climate variability and change to enhance society’s ability to plan and respond

. Support the Nation’s commerce with information for safe, efficient, and environmentally sound transportation

Operating the country's environmental satellite program, whose cloud images are seen daily on television weather forecasts, is one of NOAA’s major responsibilities. Within NOAA, the National Environmental Satellite, Data, and Information Service (NESDIS) office operates the satellites and manages the processing, distribution, and archival of the data. The NOAA satellite constellation is made up of complimentary operational environmental satellites: the Geostationary Operational Environmental Satellites (GOES) and Polar-orbiting Operational Environmental Satellites (POES). Both types of satellites are necessary for a complete global weather network.

In addition, each day NOAA’s NESDIS processes and distributes more than 3.5 billion vital bits of data and images to forecasters globally. The timeliness and quality of the combined polar and geostationary satellite data have been greatly improved by enhanced computer installations, upgraded ground facilities, and data sharing agreements with military weather services.

### 2nc Key to Monitor Pollution / Environment

#### Weather satellites are key to air pollution studies, monitoring global pollution and building accurate climate models

Hotz, 13 (6/21/2013, Robert Lee, “For Weather Satellites, Forecast Is Cloudy; Failures of Aging Devices Threaten to Leave Gap in Key Data,” <http://m.us.wsj.com/articles/SB10001424127887324049504578543331078279910?mobile=y>, JMP)

"NOAA is having a real crisis with regard to the weather satellites," said atmospheric scientist Dennis Hartmann at the University of Washington in Seattle, who heads a National Research Council committee that monitors Earth-observation satellite programs.

Signals from these highflying measuring devices provide the raw data for forecasts, rainfall estimates and drought reports, land-use surveys and air-pollution studies, seasonal wildfire forecasts and sea-ice updates, to name a few applications. Without the data, it is harder to track threatening weather, build accurate climate models or monitor global pollution, experts said.

"We need all the data we can get—every bit and byte we can get down from space," said senior system engineer Stacey Boland at the National Aeronautics and Space Administration's Jet Propulsion Laboratory in California, who is a member of the research council committee. "These older platforms—well past their warranty—are starting to falter."

### 2nc Key to Monitor Algae Blooms / Red Tides

#### Continuous satellite data key to monitor algae blooms and red tides

Goldenberg, 11 --- US environment correspondent (10/24/2011, “Weather satellite budget cuts a 'disaster in the making' - Obama official,” <http://www.theguardian.com/science/2011/oct/24/weather-satellite-cuts-disaster-obama-official>, JMP)

Mitch Goldberg, the scientist on Noaa's satellite programme, said the information and hi-resolution images from the polar orbiters were a big advance from earlier satellites.

During the 2010 Snowmageddon, information from the polar-orbiting satellite enabled Noaa scientists to accurately predict there would be 18-24in of snow up to a week before the storm, Goldberg said in a phone interview.

Forecasts without information from the polar-orbiting satellite predicted only 7-10in of snow, Goldberg said.

He said information from the satellite was also crucial to monitoring crops and wildfires, algae blooms and red tides.

But the accuracy of those forecasts were heavily dependent on maintaining a constant flow of data.

"It's all about the continuity," Goldberg said.

### 2nc Key to Climate Mitigation & Adaption

#### JPSS key to climate mitigation and adaption

Davis, 11 --- director of satellite operations at the NOAA (June 2011, Gary, “History of the NOAA Satellite Program,” <http://www.osd.noaa.gov/download/JRS012504-GD.pdf>, JMP)

JPSS will ensure continuity of crucial climate observations and weather data in the future. Data and imagery obtained from the JPSS will increase timeliness and accuracy of public warnings and forecasts of climate and weather events reducing the potential loss of human life and property damage. The data collected by JPSS will contribute to the unified and coherent long-term environmental observations and products that are critical to climate modelers and decision makers concerned with advancing climate change understanding, prediction, mitigation and adaptation strategies, policies, and science. JPSS, with its global view, will play a vital role in continuing these climate data records for the US and the international community.

#### Weather satellites key to understand climate change

Sutter, 11 (8/24/2011, John D., “NOAA: Weather satellites are in jeopardy,” <http://www.cnn.com/2011/TECH/innovation/08/24/noaa.weather.prediction/index.html?hpt=te_bn1>, JMP)

The Washington Post reports that meteorologists and officials who coordinate disaster response support additional funding, too:

"Bill Hooke, a senior fellow at the American Meteorological Society, compared what forecasters would experience when a polar-orbiting satellite is lost to waking up after having a small stroke," Andrew Freedman writes in the newspaper. "'The world that you're looking at wouldn't seem quite right to you, and you wouldn't be able to function quite as well,' he said."

Scientific American says the fact that these satellites are used to track climate change as well as weather could make the budget request unpopular with legislators, some of whom see climate change as a sticky issue.

"The information those satellites collect is also key to understanding climate change -- an unpopular topic on Capitol Hill -- but the agency has downplayed that aspect as it presses lawmakers for more cash," that magazine writes.

### 2nc Key to Economy

#### \*\*\*Note --- the Lubchenco, 12 ev in the 2nc link block also makes a strong economy internal link.

#### Satellites are key to the economy

NOAA, no date (“NOAA Satellites; The legacy of NOAA's satellites,” <http://www.jpss.noaa.gov/satellites_legacy.html>, JMP)

For more than 50 years, NOAA weather satellites have provided U.S. citizens and global partners with advance warning of extreme weather and natural disasters. Satellites are vital for the weather forecasts NOAA provides to the American public-at-large, including emergency managers and first responders, farmers and the agricultural community, the aviation industry, decision makers and political leaders, coastal residents and maritime transportation. The frequency and severity of extreme weather events, like Hurricane Sandy, serve as a reminder of the importance to maintain all the critical tools necessary for accurate weather forecasting, including key observations provided by satellites.

NOAA satellites are critical to the Nation’s infrastructure and economy. Polar satellites provide critical weather forecasting for the $700 billion maritime commerce sector and offer a value of hundreds of millions of dollars for the fishing industry. NOAA satellites can also observe volcanic eruptions and track the movement of ash clouds—at a value of $100 to $200 million to the aviation industry.

NOAA operates satellites in two complementary orbits: Geostationary satellites, which constantly monitor a fixed area on the Earth from a perch over 22,300 miles above the Earth; and Polar-Orbiting satellites, which circle the Earth around 500 miles above the surface providing information and observations over the entire Earth - land, ocean and atmosphere, from pole- to- pole. Polar satellites are able to see the weather as it takes shape around the globe, while typical geostationary weather satellites, like GOES, see the weather within their limited domain.

#### JPSS ensures weather ready nation to sustain economic growth

Rose, 6/10 (Carrie, 6/10/2014, “NOAA retires NOAA-16 polar satellite after historic run,” <http://wtvr.com/2014/06/10/noaa-retires-noaa-16-polar-satellite-after-historic-run/>, JMP)

NOAA and its partners at NASA are continuing to build the next generation of polar-orbiting satellites, the Joint Polar Satellite System (JPSS), which is scheduled to launch the JPSS-1 satellite in 2017.

NOAA’s JPSS represents significant technological and scientific advances for more accurate weather forecasting, helping build a Weather Ready Nation – saving lives and property, while promoting economic prosperity. JPSS provides continuity for critical observations of our vast atmosphere, oceans, land, and cryosphere – the frozen areas of the above planet. NOAA, working in partnership with NASA, ensures an unbroken series of global data for monitoring and forecasting environmental phenomena and understanding our Earth.

### 2nc Key to Troop Deployment / Disaster Response

#### Key to troop deployments and natural disaster response

Broun, 13 --- Chairman of the Oversight Subcommittee (9/19/2013, Paul, “Statement of Oversight Subcommittee Chairman Paul Broun (R-Ga.), Hearing on Dysfunction in Management of Weather and Climate Satellites,” http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-%20SY21-WState-B001262-20130919.pdf, JMP)

Chairman Broun: I want to extend a warm welcome to our witnesses and thank them for appearing today.

The Committee on Science, Space, and Technology has held about a dozen hearings on weather satellites, under both Republican and Democratic leadership, since 2003. Continued oversight is important because these programs are important. Data from these satellites not only help one decide whether or not to leave the house with an umbrella, they allow meteorologists to more accurately predict extreme weather, military planners to more intelligently deploy troops around the world, and emergency managers to better respond to wildfires and other natural disasters.

#### Key to troop deployments and wildfire and disaster response

McEntee, 11 --- executive director and chief executive of the American Geophysical Union (7/3/2011, Christine W., “The importance of the weather satellite,” [www.washingtonpost.com/opinions/the-importance-of-the-weather-satellite/2011/06/30/AGDTPuwH\_story.html](http://www.washingtonpost.com/opinions/the-importance-of-the-weather-satellite/2011/06/30/AGDTPuwH_story.html), JMP)

As Stephen Stromberg pointed out in his June 30 PostPartisan [“Don’t gut the Weather Service”], allowing funding for the National Oceanic and Atmospheric Administration’s Joint Polar Satellite System (JPSS) to fall victim to political debate will negatively affect weather forecasting abilities.

What he did not mention were the far-reaching consequences of such a scenario. The satellite’s data will continue to help military planners deploy troops; emergency managers fight wildfires and respond to other disasters; and farmers to plan for optimum planting. He also did not mention that this penny-wise, pound-foolish budgeting approach doesn’t just stop with JPSS funding. Results from cuts to science funding could also limit our ability to assess water quality and mitigate the impacts of natural disasters.

We need to reduce the national debt, but it would be a mistake to do that by sacrificing programs that protect public safety and national security and support global competitiveness.

#### Key to storm forecasting for the military --- necessary for homeland security

Sutter, 11 (8/24/2011, John D., “NOAA: Weather satellites are in jeopardy,” <http://www.cnn.com/2011/TECH/innovation/08/24/noaa.weather.prediction/index.html?hpt=te_bn1>, JMP)

(CNN) -- It's easy enough to take for granted how much we know about the weather these days. Take Hurricane Irene: There are plenty of weather maps showing the path of that storm, which is churning through the Caribbean on its way to the East Coast of the United States. We have a pretty good idea of where Irene is heading and how strong it will be when it hits land.

All of this, of course, gives people in North Carolina and elsewhere days to stock up on food and plan an escape route -- just in case these predictions come true.

How do we know all this stuff? Because satellites are watching.

That's the point the National Oceanic and Atmospheric Administration has been trying to make lately as it campaigns to avoid budget cuts to its program for monitoring the Earth's oceans and weather from above the atmosphere.

Here's the most pressing point that NOAA's making: A significant weather satellite that orbits the Earth in a north-south direction will die in 2016. Unless funding is put in place soon, a new program to replace that satellite won't be ready nearly in enough time.

In a series of public appearances, NOAA Administrator Jane Lubchenco has been underlining the importance of satellites in forecasting weather.

At a meeting this month in Denver, she said there probably will be a gap of time when NOAA doesn't have any working satellites on a pole-to-pole orbit, according to The New York Times' Green blog. Those north-south satellites are "essential for supporting climate research as well as operational weather and storm forecasting for civil, military, and international partners," according to a White House budget document.

"I would argue that these satellites are critically important to saving lives and property and to enabling homeland security," Lubchenco was quoted as saying during that Denver meeting, held on August 17.

For hurricanes specifically, "a loss of polar-orbiting satellite observations will result in some degradation in hurricane track and intensity forecasts in the important 3-5 day coastal evacuation planning period," NOAA spokesman John Leslie wrote in an e-mail to CNN.

There are basically two kinds of NOAA satellites above the planet: those that orbit north-south, and those that hover over a particular piece of land by traveling with the rotation of the Earth. They serve complementary functions in observing and monitoring the climate and weather. Polar-orbiting satellites are much lower to the ground, at 540 miles above the surface, as opposed to more than 22,000 miles for the "geostationary" satellites, according to NOAA's website on its satellite programs. The north-south satellites also cover much more ground, since they loop the Earth approximately every 100 minutes.

### 2nc Key to Disaster Response

#### Gap in data coverage ensures greater devastation from natural disasters

CBS Baltimore, 13 (2/20/2013, “Weather Satellites Need Replacing, But New Ones May Take Years,” <http://baltimore.cbslocal.com/2013/02/20/weather-satellites-need-replacing-but-new-ones-may-take-years/>, JMP)

BALTIMORE (WJZ) — The high-tech system that gives us early storm warnings is in jeopardy. It’s a scramble against time to replace the weather satellites that predicted Superstorm Sandy and “Snowmageddon.”

But Kai Jackson explains, the replacement satellites may not be ready for years.

Scientists say now is the time to act to replace those aging satellites.

Hurricane Katrina caused billions of dollars of damage in New Orleans and the Gulf Coast in 2005.

The infamous storm known as “Snowmageddon” dumped record amounts of powder on Maryland and the mid-Atlantic in 2010.

And recently, Hurricane Sandy leveled parts of the Jersey Shore and flooded vast areas of New York.

All of these storms would have been more devastating without advanced warning from satellites.

“A lot of them are taking images. They’re measuring water vapor in the atmosphere,” said Jim O’Leary, Maryland Science Center.

But there are renewed warnings about America’s aging satellite network. The National Oceanic and Atmospheric Administration (NOAA) and other government agencies say the ones in jeopardy are the polar orbiting satellites. They give scientists the most detailed views for weather modeling.

“Some of these are starting to fail and there’s been a delay in getting the next generation of satellites up there. So if they fail before the new satellites go up, there willl be a gap in our weather forecasting capability,” O’Leary said.

It’s critical information that allows forecasters and elected leaders to plan for evacuations and more.

“Having the capability to launch new satellites to take their place as they age is really important,” O’Leary said.

A replacement for the polar orbiting satellite isn’t expected until 2017.

#### Controlling disasters key to save millions of lives

SID-AHMED 05 Managing Editor for Al-Ahali [Mohamed Sid-Ahmed, “The post-earthquake world”, Issue #724, http://weekly.ahram.org.eg/2005/724/op3.htm]

The year 2005 began with a calamity, resulting not from conflicts between people but from an unprecedented natural disaster that has so far claimed over 155,000 lives, a figure that is expected to rise still more over the coming period. Is this Nature's reaction to the abuse it is suffering at the hands of the human race, its revenge on us for challenging its laws beyond acceptable limits?

The earthquake that struck deep under the Indian Ocean was the strongest in over a century. What is still more critical is that what we have witnessed so far is only the beginning of the catastrophe. According to a spokesman from the World Health organisation, "there is certainly a chance that we could have as many dying from communicable diseases as from the tsunamis". The logistics of providing the survivors with clean water, vaccines and medicines are formidable, and, with many thousands of bodies lying unburied, epidemics spread by waterborne diseases are expected to claim many thousands of victims. There is also the possibility of seismic activity elsewhere in the world because disturbances in the inner structure of the earth's crust have occurred and there are no means to foresee how they will unfold. Will they build up into still broader disarray and eventually move our planet out of its orbit around the sun? Moreover, even if we can avoid the worse possible scenario, how can we contain the earthquake's effects ecologically, meteorologically, economically and socially?

The contradiction between Man and Nature has reached unprecedented heights, forcing us to re-examine our understanding of the existing world system. US President George W Bush has announced the creation of an international alliance between the US, Japan, India, Australia and any other nation wishing to join that will work to help the stricken region overcome the huge problems it is facing in the wake of the tsunamis. Actually, the implications of the disaster are not only regional but global, not to say cosmic. Is it possible to mobilise all the inhabitants of our planet to the extent and at the speed necessary to avert similar disasters in future? How to engender the required state of emergency, that is, a different type of inter-human relations which rise to the level of the challenge before contradictions between the various sections of the world community make that collective effort unrealisable?

The human species has never been exposed to a natural upheaval of this magnitude within living memory. What happened in South Asia is the ecological equivalent of 9/11. Ecological problems like global warming and climatic disturbances in general threaten to make our natural habitat unfit for human life. The extinction of the species has become a very real possibility, whether by our own hand or as a result of natural disasters of a much greater magnitude than the Indian Ocean earthquake and the killer waves it spawned. Human civilisation has developed in the hope that Man will be able to reach welfare and prosperity on earth for everybody. But now things seem to be moving in the opposite direction, exposing planet Earth to the end of its role as a nurturing place for human life.

Today, human conflicts have become less of a threat than the confrontation between Man and Nature. At least they are less likely to bring about the end of the human species. The reactions of Nature as a result of its exposure to the onslaughts of human societies have become more important in determining the fate of the human species than any harm it can inflict on itself.

Until recently, the threat Nature represented was perceived as likely to arise only in the long run, related for instance to how global warming would affect life on our planet. Such a threat could take decades, even centuries, to reach a critical level. This perception has changed following the devastating earthquake and tsunamis that hit the coastal regions of South Asia and, less violently, of East Africa, on 26 December.

This cataclysmic event has underscored the vulnerability of our world before the wrath of Nature and shaken the sanguine belief that the end of the world is a long way away. Gone are the days when we could comfort ourselves with the notion that the extinction of the human race will not occur before a long-term future that will only materialise after millions of years and not affect us directly in any way. We are now forced to live with the possibility of an imminent demise of humankind.

### --- XT: Timely Data Key to Disaster Response / Warning

#### Cuts will prevent timely launch of next generation satellites necessary to early disaster response

Goldenberg, 11 --- US environment correspondent (10/24/2011, “Weather satellite budget cuts a 'disaster in the making' - Obama official,” <http://www.theguardian.com/science/2011/oct/24/weather-satellite-cuts-disaster-obama-official>, JMP)

America and Europe face a "disaster in the making" because of Congress budget cuts to a critical weather satellite, one of Barack Obama's top science officials has warned.

The satellite crosses the Earth's poles 14 times a day, monitoring the atmosphere, clouds, ice, vegetation, and oceans. It provides 90% of the information used by the National Weather Service, UK Met Office and other European agencies to predict severe storms up to seven days in advance.

But Republican budget-cutting measures would knock out that critical capacity by delaying the launch of the next generation of polar-orbiting satellites, said Jane Lubchenco, who heads the National Oceanic and Atmospheric Agency (Noaa).

"It is a disaster in the making. It's an expression of the dysfunction in our system," said Lubchenco, who was speaking at a dinner on the sidelines of the Society of Environmental Journalists meeting in Miami.

It would cost three to five times more to rebuild the project after a gap than to keep the funds flowing. "It's insanity," Lubchenco said.

2011 has set new records for extreme weather events in the US and around the world, bringing hurricanes, heatwaves, floods, tornadoes, blizzards, droughts and wildfires. Ten of those events, including last August's devastating Hurricane Irene, inflicted damages of at least $1bn.

Climate change is expected to produce more extreme weather events in the future, making accurate long-range weather forecasts even more essential.

Forecasters say the information from the polar orbiters is critical to providing early notice of unusually powerful storms and tornadoes – buying time for governments and disaster responders in both the US and Europe.

Data from the satellite is shared equally between the US and the European satellite agency, EUmetsat, which passes the information on to the Met Office and other agencies.

But budget cuts could delay the launch of its successor by up to 18 months, essentially leaving US and European forecasters with a big blind spot starting in late 2016.

"It will be going backwards in 20 years' time," said Lubchenco.

A new polar-orbiting satellite is due for launch later this week. Its life expectancy is five years, which means Noaa needs to begin designing its replacement and preparing for its launch in this budget year, she said.

Noaa had originally asked for $1.06bn for its weather satellite programme, but Congress cut that sharply. It put some of the money back in the aftermath of last April's tornadoes, which killed hundreds across the south-east and in the town of Joplin, Missouri.

#### NOAA weather satellites key to accurately track dangerous hurricanes

Romm, 11 --- most influential climate change blogger (5/23/2011, Joe, “GOP cut crucial weather satellites with fierce hurricane season looming,” <http://thinkprogress.org/climate/2011/05/23/208154/gop-cut-crucial-weather-satellites-with-fierce-hurricane-season-looming/>, JMP)

Climate Progress reported in March that NOAA said GOP’s proposed satellite funding cuts could halve accuracy of precipitation forecasts. CAP’s Kiley Kroh updates the story.

Earlier this year, Congressional Republicans decided accurate weather forecasting and hurricane tracking were services the American people could live without. The GOP-sponsored 2011 spending bill slashed the budget for the National Oceanic and Atmospheric Administration, slashing $700 million targeted for an overhaul of the nation’s aging environmental satellite system. NOAA scientists have stated unequivocally the existing satellites will fail and if they aren’t replaced, the agency’s ability to provide life-saving information to the American people will be compromised. Jane Lubchenco, NOAA administrator, told reporters yesterday that the agency’s hurricane outlook last year was “spot-on” and cautioned that “not having satellites and applying their latest capabilities could spell disaster“:

Satellites are a must-have when it comes to detecting and tracking dangerous tropical weather. Not having satellites and their capabilities could spell disaster. NOAA’s satellites underpin hurricane forecasts by providing meteorological data over vast areas where we don’t have other means of information.

Highlighting the critical need for accurate forecasting, yesterday NOAA released their annual hurricane forecast predicting yet another “above-normal” hurricane season. This year, Americans can expect up to 18 named storms and as many as six that could become category five hurricanes. Last year’s hurricane season was one of the busiest on record and that is a trend we can expect to continue. Rising ocean temperatures have been found to increase the frequency and intensity of hurricanes – and this year, ocean temperatures are four degrees higher than normal. These alarming trends aren’t limited to hurricanes – scientists have found that as a result of climate change, killer weather is now the “new normal.”

“Because we have insufficient funds in the ’11 budget, we are likely looking at a period of time a few years down the road where we will not be able to do the severe storm warnings and long-term weather forecasts that people have come to expect today,” Lubchenco said.

Though the GOP got their way this year, the battle over NOAA’s budget is far from over – if funding isn’t restored, the federal government will be limited in its ability to anticipate devastating storms and warn the citizens in harm’s way. Will the GOP be so dismissive of American lives the second time around?

– Kiley Kroh, Associate Director for Ocean Communications at the Center for American Progress Action Fund.

#### Timely data is key to effective disaster warning and response

WMTW, 14 (4/30/2014, WMTW-TV 8, “Satellites key in predicting killer storms; Inside look at NOAA's Satellite Operations Center,” <http://www.wmtw.com/news/satellites-key-in-predicting-killer-storms/25701780#!0z6st>, JMP)

When severe weather develops, it's first detected by satellites, which beam images and data back to forecasters on the ground.

Click here to watch story

The nation's fleet of weather satellites can alert forecasters to a developing storm up to seven days out. And that data is transmitted within seconds around the globe.

Just outside the nation's capital, an around-the-clock operation serves as central hub of critical weather information. Giant antennas take in some 16 billion bytes of data from 16 satellites every day.

"These antennas up here on the roof then take the data, pull it in and that's where the supercomputers down in this building grab it," said Michael Condray, with NOAA's satellite and product operations.

And engineers like Stan Abney process it.

"Right now I'm getting ready to set up for a pass with Fairbanks, one of our sites we take data from. As the satellite goes across, we capture data from Fairbanks or Wallops," said Abney.

It was data like this that gave forecasters a heads-up days in advance of the deadliest outbreak of tornadoes in decades -- storms that killed 300 people in six states in April 2011.

Giving forecasters advance warning that a potentially deadly storm is brewing could save lives.

"These folks will command the satellite and tell the satellite to focus its attention onto one particular area and start taking very rapid pictures," said Condray.

#### NOAA satellites are critical to effective weather forecasting --- they must be fully funded

Blakey, 12 --- president and CEO of the Aerospace Industries Association (6/29/2012, Marion C., “Funding weather satellites crucial for storm forecasting,” <http://articles.orlandosentinel.com/2012-06-29/opinion/os-ed-weather-satellites-nasa-062912-20120628_1_geostationary-operational-environmental-satellite-severe-weather-noaa>, JMP)

Several years ago, when a senior government official was testifying before Congress in defense of weather-satellite budgets, he was stunned to be asked by a member, "Why are we building meteorological satellites when we have the Weather Channel?"

Those of us in the aerospace industry know the short answer: Without the National Oceanic and Atmospheric Administration, there would be no Weather Channel. The satellite imagery and data utilized by the Weather Channel and countless other reporting and predicting outlets are generated by satellites operated by NOAA and developed under the auspices of the National Aeronautics and Space Administration.

In fact, more than 90 percent of all weather data generated for NOAA forecasts comes from government satellites. These satellites are the critical tools used to generate complex forecasting models and the watches and warnings that help people prepare for tornadoes, hurricanes, blizzards and other severe weather.

These satellites save lives. After a catastrophic tornado struck Joplin, Mo., in May 2011, NOAA Deputy Administrator Kathryn Sullivan was surveying the damage when a woman, with tears in her eyes, said that NOAA forecasts had probably saved her family. It was a poignant moment in the aftermath of a storm that cost 160 lives.

Rarely does someone so clearly express an understanding of the direct connection between government investments and the impact it has on people's lives. But it's a connection that we're hoping will increasingly be made by policymakers in Washington.

At a time when the number of severe weather events is on the rise, full funding of U.S. satellite programs must be ensured.

The 2013 NOAA budget request includes money for the Geostationary Operational Environmental Satellite – R Series. When launched in 2015, this satellite will provide a wide-angle view of atmospheric conditions and updates on the likelihood of a storm to spawn tornadoes. These satellites will provide new data in intervals of seconds, versus the seven-and-a-half-minute intervals provided by current technologies. This system is expected to significantly improve severe weather warning time, nearly doubling the amount of time people will have to take shelter after the initial alert.

This program was significantly underfunded this year. Fortunately, the White House has proposed to restore needed funding, both for this satellite system and another program critical to accurate early forecasts, the Joint Polar Satellite System.

But today both these systems have fallen under a new dark cloud: the budget menace known as sequestration, or automatic spending cuts.

Last year's Budget Control Act requires across-the-board cuts to NASA and NOAA beginning in January — but due to advance notification requirements on employee terminations and contracting requirements and best practices, the impact of this budget sequestration will be felt before the fall election. A cut of 9.1 percent to NASA next year would eliminate $1.6 billion from the agency's budget. NOAA's weather-satellite programs would be cut by $182 million.

An estimate released last year by Congressman Norm Dicks, chairman of the House Appropriations subcommittee with oversight of science funding, stated that sequestration would result in a two- to four-year period in which weather data from NOAA's polar-orbiting satellite would be unavailable, and up to 10 percent of staffing and resources for local weather warnings and forecasts would be eliminated. As he put it, this would be "putting American communities at greater risk from tornadoes, hurricanes and other major weather events."

In short, sequestration would hit space programs like a tidal wave, making the programs' current cost and schedule challenges seem inconsequential.

Last year, NOAA ran a test using 1960s technology to see what the 2010 "Snowmaggedon" forecast would have been using only buoys and weather balloons for modeling data. Without satellites, the models underestimated snowfall by 10 inches.

We can't let sequestration take weather forecasting back to the 1960s. NOAA satellite systems are saving lives and money at a time when our weather is becoming more volatile. Congress should end sequestration and ensure that communities continue to receive information to keep people safe.

An old saying claims "you can't predict the weather," but we're certainly getting better at it. Now we need to make sure Congress doesn't turn back the clock.

### 2nc Key to Agriculture / Oil & Gas Industry

#### Gap in weather coverage will undermine agriculture and oil and gas industries

Morello, 11 (5/20/2011, Lauren, “As Big Hurricane Season Looms, NOAA Chief Calls Satellite Cuts a "Disaster" <http://www.scientificamerican.com/article/as-big-hurricane-season-looms-noaa-chief-calls-satellite-cuts-disaster/>, JMP)

**\*\*\*Note --- Jane Lubchenco is NOAA Administrator**

"Satellites are a must-have when it comes to detecting and tracking dangerous tropical weather. Not having satellites and their capabilities could spell disaster," Lubchenco said yesterday. "NOAA's satellites underpin hurricane forecasts by providing meteorological data over vast areas where we don't have other means of information."

The information those satellites collect is also key to understanding climate change -- an unpopular topic on Capitol Hill -- but the agency has downplayed that aspect as it presses lawmakers for more cash.

"We are working very closely with Congress for this satellite program," Lubchenco said. "We continue to emphasize how much, how important this program is as a matter of public safety. This is of national significance, and we are hopeful we will be able to get the funding to get this program back on track."

A major scientific group echoed those concerns yesterday.

"Funding JPSS is a national preparedness issue," Christine McEntee, executive director of the American Geophysical Union, said in a statement yesterday. "A gap in satellite coverage could jeopardize everything from agriculture and aviation safety, to the oil and gas industry, to wildfire response and other search and rescue operations."

### 2nc Key to U.S. Leadership in Weather Forecasting

#### Upgraded weather satellites key to maintain U.S. leadership in weather forecasting

Stewart, 13 --- Environment Subcommittee Chairman (9/19/2013, “Statement of Environment Subcommittee Chairman Chris Stewart (R-Utah), Hearing on Dysfunction in Management of Weather and Climate Satellites,” <http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-%20SY18-WState-S001192-20130919.pdf>, JMP)

Chairman Stewart: Thank you, Dr. Broun, for holding this important hearing. The Science Committee has a long history overseeing the management of NOAA and NASA weather and climate satellite systems. Unfortunately, these programs have been rife with issues for more than a decade. Topics at issue today are also very timely as they relate to legislation being considered by this Committee, “The Weather Forecasting Improvement Act of 2013,” which attempts to focus critical resources on developing a top notch weather forecasting system based on streamlined research-to-operations and a more reasonable balance of resources toward weather research.

All of our witnesses acknowledge the strong possibility of a data gap for one or both of our major weather satellite systems in a few short years. These satellites provide the majority of data for numerical weather prediction in this country, and a gap could be catastrophic for forecasting by the National Weather Service and our innovative weather enterprise. A potential gap in polar-orbiting or geostationary satellite data, combined with continuing issues with how NOAA develops, analyzes, procures and integrates other satellite and observational information, risks the permanent loss of U.S. leadership in weather forecasting. The writing is on the wall, and our current trajectory is unacceptable.

As the Government Accountability Office will testify, our geostationary and polar-orbiting programs, known as GOES and JPSS, have been plagued with cost overruns, technical issues, and delays. We need to consider the right mix of satellite technology to make timely, accurate, and effective forecasts to protect American lives and property.

For our polar orbiting satellites, not only is there a potential gap in the 2016 to 2018 timeframe, but there may also be issues between the first and second JPSS satellites in the early 2020s.

While the GOES-R program has made progress in completing testing for several components, the program has still missed several key milestones for both flight and ground segments. This has caused the launch date for GOES-R to slip from October 2015 to March 2016. There are also other technical problems on the horizon, including with the Geostationary Lightning Mapper, an instrument that also appears to duplicate some already-existing commercial capabilities.

Robust contingency planning and implementation of those plans as suggested by GAO is essential. We have seen that it has taken several years for NOAA to validate key products on the SUOMI-NPP satellite. Just after the Oklahoma tornadoes this year, a micrometeoroid appears to have hit an existing GOES satellite, turning all of its instruments off. Murphy’s Law seems to be on full display when it comes to our weather satellites, and continued blue sky self-evaluations by NOAA could prevent us from dealing with these problems before they arise.

It has taken the Administration several years and the prodding of this Committee and GAO to fully acknowledge the very real risk of a data gap, and we need to look at all options to mitigate potential breakdowns in our forecasting ability. While NOAA has paid for reports to examine gap mitigation options I have fear that not enough has been done to pursue implementation of these backup plans. We need to look at American, and potentially commercial, sources for these critical data. It should be alarming that we may be in a position of having to rely on international partners for weather data to protect lives and property, an outcome that could raise much greater quality and access concerns than some of the potential commercial partners that have so far been rebuffed by NOAA.

### AT: We Can Get Weather Data From Others / New Satellites Not Necessary \*\*\*

#### Cuts delay launch of JPSS and cause gap in coverage data --- there are no other sources for critical weather data

Pittman, 12 --- associate editor of Emergency Management magazine (1/16/2012, Elaine, “Delay in Satellites Could Jeopardize Severe Weather Forecasts,” <http://www.emergencymgmt.com/disaster/Satellites-Could-Jeopardize-Severe-Weather-Forecasts.html>, JMP)

**\*\*\*Note --- Ajay Mehta is deputy director for NOAA’s Joint Polar Satellite System**

Because of a funding reduction, Ajay Mehta, deputy director for NOAA’s Joint Polar Satellite System (JPSS), said the launch of the new satellite, called JPSS-1, was delayed. JPSS-1 will replace a NASA satellite that was launched on Oct. 28, 2011. NASA’s satellite — called the National Polar-Orbiting Operational Environmental Satellite System Preparatory Project, or NPP for short — will provide operational data for four or five years.

“That is an important thing for our continuity because [it’s] the last of the old generation of satellites we had launched in 2009,” Mehta said. “That one is only going to last for another couple of years.”

While NASA’s satellite is providing continuity of information, its life cycle is expected to end in 2016, and Mehta estimated that JPSS-1 won’t be fully operational until 2017. The time between NPP and JPSS-1 is when the information gap is expected.

“For the polar orbit, we have had operational satellites since 1979, so this mission is critical to provide continuity of NOAA operational data sets,” said Mitch Goldberg, JPSS program scientist. “NOAA has products and services, such as weather forecasting, and they depend on this constant flow of data from satellites going to weather prediction models.”

Funding Issues Abound

Last year was rife with concerns over how much funding NOAA’s satellite program would receive and what that would mean for the future of severe weather forecasting in the United States. NOAA Administrator Jane Lubchenco had many poignant sound bites in 2011, including that budget cuts to the satellite would be a “disaster in the making;” that in a few years, the agency may not be able to do the severe storm warnings that people have come to expect; and that it could cost three to five times more to rebuild the project than to keep funds flowing toward it.

President Barack Obama requested a little more than $1 billion for 2011 and beyond for the polar-orbiting satellite program. On Nov. 18, 2011, legislation was enacted that gave JPSS $924 million for 2012. “While we’re happy with the level of funding in this fiscal environment, it was still almost $150 [million] less than the president’s request — therefore it will not eliminate the possibility of a gap,” Mehta said via email.

Accuracy Is Key

When thinking about impacts that the information gap could have on emergency management, a question arises: What would be different?

To help assess how beneficial the information from polar-orbiting satellites is to weather forecasting, the National Weather Service reran forecasts for Snowmageddon, the blizzard that hit the East Coast in February 2010, without the satellites’ data. “When they took the data out, they ended up mis-forecasting it by almost 50 percent,” Mehta said. With the polar-orbiting data, a 20-inch snowfall was predicted, and without it the forecast was 10 inches of snow. In reality during the week of storms, 28.6 inches of snow fell in Washington, D.C. — the most since 1922, according to NOAA.

“You can imagine the difference for decision-makers,” said Goldberg. “If someone tells you there is going to be a seven-inch snowstorm or two-foot snowstorm, you’re going to make different decisions based on those two scenarios.”

The last year also has seen an increase in severe weather. From the tornadoes in Alabama and Missouri to Hurricane Irene impacting the East Coast, tremendous amounts of devastation have occurred across the U.S., the forecasts for which have been “very good,” Goldberg said. Without data from the polar-orbiting satellites, however, he said there would be a major degradation of weather forecast performance.

Another issue is this information can’t be obtained from other sources. Although the United States partners with Europe’s satellite program, data from both orbits is needed, said Mehta. He added that NOAA is exploring all options and has looked into privately owned satellites — but that would not help prevent the predicted information gap.

“Our estimates show that for somebody to build a new instrument and launch it, it’s going to take much longer,” he said, “because we’ve already started building the instruments and spacecraft for JPSS-1.”

And the lack of additional information sources also applies to state and local emergency management agencies. Larry Gispert, past president of the International Association of Emergency Managers and former emergency management director of Hillsborough County, Fla., said everyone — the private and public sectors — relies on NOAA and the National Weather Service for severe weather information. He said some companies will process that data and put their own spin on it — “but they all get that data from the federal government.”

#### China is not reliable for weather data

Broun, 13 --- Chairman of the Oversight Subcommittee (9/19/2013, Paul, “Statement of Oversight Subcommittee Chairman Paul Broun (R-Ga.), Hearing on Dysfunction in Management of Weather and Climate Satellites,” http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-%20SY21-WState-B001262-20130919.pdf, JMP)

As I have said before, it is frustrating to watch these important programs struggle. But it is even more frustrating to be told by NOAA and NASA that “all is well” when we all know that is not the case. An IG report, GAO reports, and a 2012 independent report sponsored by NOAA all say otherwise, with the independent report going so far as to use the word “dysfunctional” in its analysis of the weather satellite programs. Another independent NOAA-commissioned report released this year described the possibility of the United States’ reliance on China for satellite data as a “silver bullet.” I have grave concerns about incorporating data into U.S. systems from a country well-known for its persistent and malicious cyber attacks against our nation.

### AT: Other Satellites Solve

#### Backbone of data is from GOES-R and JPSS Programs --- but it is augmented from other sources

Kicza, 13 --- Assistant Administrator National Environmental Satellite, Data, and Information Service at NOAA (9/19/2013, Mary E., “HEARING TITLED DYSFUNCTION IN MANAGEMENT OF WEATHER AND CLIMATE SATELLITES BEFORE THE SUBCOMMITTEES ON ENVIRONMENT AND OVERSIGHT COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES,” <http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-SY21-WState-MKicza-20130919.pdf>, JMP)

My testimony today will focus on the progress that NOAA, with NASA as our acquisition agent, is achieving in developing the Nation’s next generation geostationary and polar-orbiting satellite systems, the GOES-R Series and JPSS Programs. While these geostationary and polar-orbiting systems provide the backbone of data that drive the NWS numerical weather prediction models, NOAA augments its observational needs by leveraging data from research satellites (e.g., NASA EOS and Advanced Composition Explorer); by using data from Department of Defense satellites (e.g., Defense Meteorological Satellite Program); by purchasing data from the commercial sector (e.g., lightning data and space-based Synthetic Aperture Radar); by implementing international agreements to ingest data from partner organizations (e.g., Metop data, Constellation Observing System for Meteorology, Ionosphere and Climate (COSMIC) data); and by jointly procuring satellite systems through domestic (e.g., Deep Space Climate Observatory (DSCOVR) refurbishment) and international partnerships (e.g., Jason-3 acquisition).

## Affirmative Answers

### AFF --- AT: Weather Satellites / JPSS

#### NOAA will still be able to do weather forecasts even if there is a data gap

Kicza, 13 --- Assistant Administrator National Environmental Satellite, Data, and Information Service at NOAA (9/19/2013, Mary E., “HEARING TITLED DYSFUNCTION IN MANAGEMENT OF WEATHER AND CLIMATE SATELLITES BEFORE THE SUBCOMMITTEES ON ENVIRONMENT AND OVERSIGHT COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES,” <http://science.house.gov/sites/republicans.science.house.gov/files/documents/HHRG-113-SY21-WState-MKicza-20130919.pdf>, JMP)

With funds provided by the Public Law 113-2, “Disaster Relief Appropriations Act of 2013,” NOAA is implementing a number of strategic actions designed to make its weather forecasting enterprise more robust in the face of the possibility of a gap in polar-orbiting weather data. These activities seek to make better use of existing data, take advantage of new data sources planned in the future, improve operational high performance computing capacity, and improve the assimilation of data into weather prediction models, including hurricane models. The goal is to minimize the impact of a gap in coverage should it become a reality. While none of these activities, individually or collectively, can totally replace a lack of JPSS data, they represent the positive actions NOAA can take to mitigate the loss of these data. Should a data gap not occur, these investments will nonetheless improve NOAA’s ability to use existing data, thus improving weather forecasts. These actions are being taken in addition to the steps NOAA is taking to ensure that JPSS and GOES-R Series satellite development continue as planned.

#### Need for every additional satellite is overhyped

Tracton, 12 (3/29/2012, Steve, “National Weather Service budget cuts misguided, misplaced,” <http://www.washingtonpost.com/blogs/capital-weather-gang/post/national-weather-service-budget-cuts-misguided-misplaced/2012/03/29/gIQAmm6qiS_blog.html>, JMP)

One striking way to look at this is to note that $2 billion for weather satellites is more than twice that of the entire NWS ($972 million)! Moreover, the casualties of the 2013 budget cuts are just the tip of the iceberg of implicit budget constraints (not actual cuts) imposed for years by satellite programs on other promising and much less costly programs within the NWS.

This does not mean weather satellites are not crucial for weather analysis and prediction. They most definitely are.

The issue is whether the value of each and every current and prospective satellite (and each individual sensor housed therein) - given the extant large menagerie of U.S (and international) polar and geostationary satellites - has reached the point of diminishing returns.

The answer is yes and no depending upon whether their intended contribution to specific operational forecasting needs and requirements are justifiable. This includes consideration of mission redundancy (with other satellite systems) and the capability to provide additional information otherwise unobtainable which demonstrably contributes to improving weather predictions and their value to mission specific objectives (e.g., increased lead time and confidence in winter storm forecasts, conditions conducive for outbreaks of thunderstorm complexes and tornadoes).

The reality is there is considerable reason to believe that the uncompromisingly high priority given to some high price-tag satellite programs is not justifiable. Claims to their criticality to forecasting have been excessively hyped and not sufficiently substantiated. I’ll discuss this in additional detail in a follow-up blog post, Part II.

#### Uniqueness outweighs --- strong bipartisan support for weather satellite funding

Leone, 14 (4/28/2014, Dan, “Profile | Mary Kicza, Assistant Administrator for Satellite and Information Services, U.S. National Oceanic and Atmospheric Administration,” <http://www.spacenews.com/article/features/40378profile-mary-kicza-assistant-administrator-for-satellite-and-information>, JMP)

Despite almost constant partisan strife in the U.S. Congress, lawmakers on both sides of the aisle agree on this much: It’s worth knowing when to pack an umbrella.

If they had any inclination to waver on this shared principle, it evaporated in the wake of Hurricane Sandy. Weather satellite data were instrumental in predicting the highly destructive storm’s track along the U.S. Eastern Seaboard in October 2012, giving those in its path crucial time to prepare.

Thus NOAA’s two main weather satellite development programs — the Geostationary Operational Environmental Satellite (GOES)-R and Joint Polar Satellite System (JPSS) — were fully funded in the omnibus spending bill that passed in December and covers federal activities for the remainder of 2014. What’s more, Congress tried to shield these efforts from sequestration, the across-the-board spending cuts that affected virtually all other federal activities beginning in March 2013.

#### **JPSS program is plagued with runaway costs and mismanagement and most recent NOAA budget underfunds weather research**

Representative Smith, 14 (4/30/2014, Rep. Smith, Lamar - (R-TX), Congressional Documents and Publications. House Science, Space, and Technology Subcommittee on Environment Hearing - "An Overview of the National Oceanic and Atmospheric Administration Budget Request for FY2015," Factiva, JMP)

Chairman Smith: Thank you Chairman Schweikert, and thank you Administrator Sullivan for being with us here today. Let me congratulate you on being named one of Time Magazine's 100 most influential people of 2014.

Our Committee oversees NOAA's more than five billion dollar budget. NOAA is responsible for critical science activities related to oceans, weather and climate.

Today we are here to discuss the President's FY15 budget request for NOAA of $5.5 billion, a 3.3 percent increase over 2014 levels. While I support many of these areas of research and forecasting, other parts of the President's FY15 budget request are harder to justify.

For example, the Administration's request substantially increases funding for climate research and for some non-critical climate satellite activities. In comparison, funding for the National Weather Service and weather forecasting research is essentially flat.

Almost $190 million is requested for climate research, more than twice the amount dedicated to weather research. There are 13 other agencies that are involved in climate change research, and according to the Congressional Research Service, they have spent $77 billion between 2008 and 2013.

For example, in addition to NOAA, NASA, the Department of Energy, and the National Science Foundation also carry out climate change modeling.

Unfortunately, NOAA's models do not match up with observed changes and have not predicted regional climate changes. And NOAA's website, Climate.Gov, includes non-peer reviewed materials promoting climate alarmism for children.

These misguided priorities are troubling. Instead of hyping climate alarmism, NOAA should focus its efforts on other areas such as improving weather forecasting.

America's leadership has slipped in severe weather forecasting. European weather models routinely predict America's weather better than we can.

I am also concerned that NOAA's satellite division now comprises over 40 percent of the total budget request for the agency, at over $2 billion. In 2008, the satellite budget came in under a billion dollars and was roughly one-quarter of NOAA's overall spending. The budget for this office has ballooned dramatically over the last decade.

For instance, the Joint Polar Satellite System program has been plagued with runaway costs and mismanagement, which raises questions about future funding for the project and its expected launch dates.

Even NOAA's own optimistic schedule would still leave us with a gap for critical weather data in the middle part of this decade.

Meanwhile the chronic cost over-runs of NOAA's satellites have forced significant reductions in funding for important activities in areas such as oceans, fisheries, and weather.

NOAA is a mission-oriented agency, and this Committee supports these core priorities. We face fiscal constraints that force us to make difficult choices about our science and technology resources.

Rather than devoting limited dollars to duplicative and alarmist climate change activities, NOAA should focus on research and forecasting capabilities that protect lives and property.

### --- XT: Delays / Gaps in Coverage Coming

#### Cost overruns and delays now and even if satellites are launched on schedule there will be a months of limited coverage

WMTW, 14 (4/30/2014, WMTW-TV 8, “Satellites key in predicting killer storms; Inside look at NOAA's Satellite Operations Center,” <http://www.wmtw.com/news/satellites-key-in-predicting-killer-storms/25701780#!0z6st>, JMP)

NOAA is working to launch the next generation of weather satellites, but for now the program remains on a federal high-risk list.

The Government Accountability Office cites the potential for a gap in satellite data if older satellites fail before new ones can be put in place.

NOAA said a satellite data gap could result in less accurate forecasts. The Commerce Department's inspector general said cost overruns and delays are to blame.

NOAA said the next wave of polar orbiting satellites will begin launching in 2017.

A new geostationary satellite is scheduled to launch in early 2016.

Even if those schedules are met, the inspector general said we could see 10 to 16 months of limited satellite coverage.

#### Data gap still likely despite full funding now

Leone, 14 (4/28/2014, Dan, “Profile | Mary Kicza, Assistant Administrator for Satellite and Information Services, U.S. National Oceanic and Atmospheric Administration,” <http://www.spacenews.com/article/features/40378profile-mary-kicza-assistant-administrator-for-satellite-and-information>, JMP)

Thus NOAA’s two main weather satellite development programs — the Geostationary Operational Environmental Satellite (GOES)-R and Joint Polar Satellite System (JPSS) — were fully funded in the omnibus spending bill that passed in December and covers federal activities for the remainder of 2014. What’s more, Congress tried to shield these efforts from sequestration, the across-the-board spending cuts that affected virtually all other federal activities beginning in March 2013.

Nonetheless, the possibility of a gap in NOAA’s data-collection capabilities still looms, thanks largely to the 2010 cancellation of a troubled polar-orbiting weather satellite program that was intended to replace separate legacy systems operated by NOAA and the U.S. Air Force, and delays to JPSS, the civilian program that emerged in its stead.

Also facing uncertainty are certain climate change sensors that are now NOAA’s responsibility but cannot fit on the first JPSS platform. NOAA had planned to fly these sensors on a dedicated satellite dubbed Polar Free Flyer, but Congress chose not to fund that program in 2014 and the agency is now looking at alternatives.

#### Weather satellite failures now --- there will be a long gap in coverage

Hotz, 13 (6/21/2013, Robert Lee, “For Weather Satellites, Forecast Is Cloudy; Failures of Aging Devices Threaten to Leave Gap in Key Data,” <http://m.us.wsj.com/articles/SB10001424127887324049504578543331078279910?mobile=y>, JMP)

The main U.S. weather satellite watching the eastern seaboard malfunctioned last month for the second time in a year, underscoring the hazards of aging satellites that monitor the planet as a threatening hurricane season gets under way.

Engineers got it running again. But the difficulties with the seven-year-old weather satellite, called GOES-13, are a symptom of a broader problem, federal, congressional and university analysts say. Scientists are losing one by one their orbital eyes on Earth, at a time when space-based sensors have become indispensable for monitoring weather, natural disasters and the atmosphere.

Weather forecasters soon will lose key satellite images and atmospheric measurements for a year or substantially more, because GOES-13 and another spacecraft are expected to fail before replacements can be launched, federal and congressional auditors said. About 500 federal projects and private contractors—including commercial firms that use the images for TV weather forecasts—rely on data from the satellites operated by the National Oceanic and Atmospheric Administration.

"NOAA is having a real crisis with regard to the weather satellites," said atmospheric scientist Dennis Hartmann at the University of Washington in Seattle, who heads a National Research Council committee that monitors Earth-observation satellite programs.

#### Major gaps in coverage likely --- programs are mismanaged and behind schedule

Hotz, 13 (6/21/2013, Robert Lee, “For Weather Satellites, Forecast Is Cloudy; Failures of Aging Devices Threaten to Leave Gap in Key Data,” <http://m.us.wsj.com/articles/SB10001424127887324049504578543331078279910?mobile=y>, JMP)

All told, 14 of the 23 active satellites monitored by NASA's Earth Observing System Project Science Office at the Goddard Space Flight Center in Greenbelt, Md., have exceeded their engineering design life, with few replacements in view. The number of Earth-monitoring sensors in orbit aboard such spacecraft is expected to drop to fewer than 30 by the end of the decade from 110 last year, as aging satellites fail, costs soar and space missions go awry, according to the National Research Council.

NOAA normally relies on two types of weather satellites: One set, including GOES-13, in "geosynchronous" orbit 22,300 miles above the same fixed spot over the U.S., and a second set of satellites that travels in a lower polar orbit and scans the entire Earth every day. One polar orbiter—itself already a temporary replacement—is nearing the end of its estimated life span.

NOAA, NASA and the Defense Department have tried since 1994 to develop new polar-orbiting weather satellites, but their joint effort was racked by mismanagement, billions in cost overruns and technical challenges, said information-technology expert David Powner at the U.S. Government Accountability Office.

NOAA's current $12.9 billion effort to replace the polar spacecraft is so far behind schedule that the next satellite won't be launched until 2017 at the earliest, which is past the design lifetime of the youngest polar-orbiting satellite currently in orbit, according to GAO auditors and the Commerce Department's Inspector General.

As a result, experts expect to start losing some weather-satellite data as soon as next year, with a gap in satellite coverage lasting from 17 to 53 months.

At the same time, NOAA's $10.9 billion program to build new geosynchronous weather satellites is struggling.

A replacement for GOES-13 is scheduled to launch in 2015. Federal and congressional auditors, though, warn it may be a year late. Even then, some of its advanced sensors won't be ready. Budget cuts related to the so-called sequester may delay the launch an additional two to three years.

Senior NOAA officials this month didn't want to be questioned about their effort to replace the weather satellites, turning down requests for interviews. In a statement, they said NOAA "continues to develop mitigation plans for any potential gap in satellite coverage. These plans will be reassessed on a biannual basis to account for new developments as they occur."

So far, GOES-13 has survived the hard knocks of space.

The Boeing Co.-built spacecraft normally tracks weather along the Atlantic coast, but on May 22 it stopped transmitting images. By June 10, NOAA satellite engineers concluded it had been knocked off balance when a tiny space rock smashed into its solar panels. As a stopgap, NOAA engineers activated their sole backup weather satellite while they scrambled to repair the errant spacecraft.

"We were essentially riding on our spare tire," said atmospheric scientist Marshall Shepherd at the University of Georgia, who is president of the American Meteorological Society. "And that spare is in the twilight of its career."

### --- XT: NOAA Budget Cuts Weather Research

#### Most recent NOAA budget cuts weather research

Gustin, 14 (4/30/2014, Georgina, CQ Executive Briefings, “NOAA Defends Focus on Climate Change Impacts,” Factiva, JMP)

The full committee chairman, Lamar Smith, R-Texas, challenged NOAA's emphasis on climate research in general. "Instead of hyping climate alarmism," he said, "NOAA should focus its efforts on other areas such as improving weather forecasting."

In the wake of major tornadoes across the south in the past two days that killed at least 34 people, Sullivan was also challenged by subcommittee member Jim Bridenstine, R-Okla., on the agency's cuts to weather research under the Office of Oceanic and Atmospheric Research. "The priority of NOAA is to save lives and property," Bridenstine said, adding "yet all the research elements are going to climate change."

Sullivan told the panel that the agency's potentially life-saving, predictive capability "doesn't come from understanding weather, it comes from understanding oceans and the atmosphere."

### --- Disaster Response Impact Answers

#### Empirically disaster relief has failed even with advanced warning

Mener 7 (Andrew S., senior Political Science major, PhD candidate for polysci “DISASTER RESPONSE IN THE UNITED STATES OF AMERICA: An Analysis of the Bureaucratic and Political History of a Failing System” CUREJ - College Undergraduate Research Electronic Journal – UPENN, http://repository.upenn.edu/cgi/viewcontent.cgi?article=1068&context=curej, CMR)

Despite having responded to thousands of natural disasters and numerous terrorist attacks, at present the United States government at the federal, state, and local levels is exceedingly unprepared to handle the immediate aftereffects of disasters. The federal government has created numerous large bureaucracies and congressional panels as well as generated hundreds of official reports each of which purports to detail appropriate disaster response guidelines. Nonetheless, the improvements since the first disaster response plan was implemented during World War I are not palpable. During the most recent major Hurricanes – Katrina and Rita – despite having significant advanced notice of the impending natural disaster as well as years of investigative reports warning about the fragility of the New Orleans levy system, the disaster response system failed the citizens of Louisiana and the Gulf Coast. That the system requires repair is not debatable. The questions which remain are how the current system came to be, what our expectations of the system should be, and how we ought to shock the political bureaucracy into action to repair the obviously ailing system.

### --- Military Readiness Impact Answer

#### Deterrence fails

Kober, Ph.D., 10—Research Fellow in Foreign Policy Studies, Cato, PhD, Fletcher School of Law and Diplomacy, Tufts. (Stanley, The Deterrence Illusion, 13 June 2010, http://www.cato.org/pub\_display.php?pub\_id=11898, AMiles)

And just like the situation at the beginning of the last century, deterrence is not working. Much is made, for example, of the North Atlantic Treaty Organisation (NATO) invoking Article V — the famous "three musketeers" pledge that an attack on one member is to be considered as an attack on all — following the terrorist attacks of September 11. But the United States is the most powerful member of NATO by far. Indeed, in 2001, it was widely considered to be a hegemon, a hyperpower. Other countries wanted to be in NATO because they felt an American guarantee would provide security. And yet it was the US that was attacked. This failure of deterrence has not received the attention it deserves. It is, after all, not unique. The North Vietnamese were not deterred by the American guarantee to South Vietnam. Similarly, Hezbollah was not deterred in Lebanon in the 1980s, and American forces were assaulted in Somalia. What has been going wrong? The successful deterrence of the superpowers during the cold war led to the belief that if such powerful countries could be deterred, then lesser powers should fall into line when confronted with an overwhelmingly powerful adversary. It is plausible, but it may be too rational. For all their ideological differences, the US and the Soviet Union observed red lines during the cold war. There were crises — Berlin, Cuba, to name a couple — but these did not touch on emotional issues or vital interests, so that compromise and retreat were possible. Indeed, what we may have missed in the west is the importance of retreat in Soviet ideology. "Victory is impossible unless [the revolutionary parties] have learned both how to attack and how to retreat properly," Lenin wrote in Left-Wing Communism: An Infantile Disorder. When the Soviets retreated, the US took the credit. Deterrence worked. But what if retreat was part of the plan all along? What if, in other words, the Soviet Union was the exception rather than the rule? That question is more urgent because, in the post-cold war world, the US has expanded its security guarantees, even as its enemies show they are not impressed. The Iraqi insurgents were not intimidated by President Bush's challenge to "bring 'em on". The Taliban have made an extraordinary comeback from oblivion and show no respect for American power. North Korea is demonstrating increasing belligerence. And yet the US keeps emphasising security through alliances. "We believe that there are certain commitments, as we saw in a bipartisan basis to NATO, that need to be embedded in the DNA of American foreign policy," secretary of state Hillary Clinton affirmed in introducing the new National Security Strategy. But that was the reason the US was in Vietnam. It had a bipartisan commitment to South Vietnam under the Southeast Asia Treaty Organisation, reaffirmed through the Tonkin Gulf Resolution, which passed Congress with only two dissenting votes. It didn't work, and found its commitments were not embedded in its DNA. Americans turned against the war, Secretary Clinton among them. The great powers could not guarantee peace in Europe a century ago, and the US could not guarantee it in Asia a half-century ago.

### AFF --- AT: Climate Change Impact

#### The impact of climate change is hype

IBD, 14 (5/13/2014, Investor’s Business Daily, “Obama Climate Report: Apocalypse Not,” Factiva, JMP)

Climate: Not since Jimmy Carter falsely spooked Americans about overpopulation, the world running out of food, water and energy, and worsening pollution, has a president been so filled with doom and gloom as this one.

Last week's White House report on climate change was a primal scream to alarm Americans into action to save the earth from a literal meltdown. Maybe we should call President Obama the Fearmonger in Chief.

While scientists can argue until the cows come home about what will happen in the future with the planet's climate, we do have scientific records on what's already happened. Obama moans that the devastation from climate change is already here as more severe weather events threaten to imperil our very survival.

But, according to the government's own records — which presumably the White House can get — severe weather events are no more likely now than they were 50 or 100 years ago and the losses of lives and property are much less devastating.

Here is what government data reports and top scientists tell us about extreme climate conditions:

• Hurricanes: The century-long trend in Hurricanes is slightly down, not up. According to the National Hurricane Center, in 2013, "There were no major hurricanes in the North Atlantic Basin for the first time since 1994. And the number of hurricanes this year was the lowest since 1982."

According to Dr. Ryan Maue at Weather Bell Analytics, "We are currently in the longest period since the Civil War Era without a major hurricane strike in the U.S. (i.e., category 3, 4 or 5)"

• Tornadoes: Don't worry, Kansas. The National Oceanic and Atmospheric Administration says there has been no change in severe tornado activity. "There has been little trend in the frequency of the stronger tornadoes over the past 55 years."

• Extreme heat and cold temperatures: NOAA's U.S. Climate Extremes Index of unusually hot or cold temperatures finds that over the last 10 years, five years have been below the historical mean and five above the mean.

• Severe drought/extreme moisture: While higher than average portions of the country were subjected to extreme drought/moisture in the last few years, the 1930's, 40's and 50's were more extreme in this regard. In fact, over the last 10 years, four years have been below the average and six above the average.

• Cyclones: Maue reports: "the global frequency of tropical cyclones has reached a historical low."

• Floods: Dr. Roger Pielke Jr., past chairman of the American Meteorological Society Committee on Weather Forecasting and Analysis, reports, "floods have not increased in the U.S. in frequency or intensity since at least 1950. Flood losses as a percentage of U.S. GDP have dropped by about 75% since 1940."

• Warming: Even NOAA admits a "lack of significant warming at the Earth's surface in the past decade" and a pause "in global warming observed since 2000." Specifically, NOAA last year stated, "since the turn of the century, however, the change in Earth's global mean surface temperature has been close to zero."

Pielke sums up: "There is no evidence that disasters are getting worse because of climate change. ... It is misleading, and just plain incorrect, to claim that disasters associated with hurricanes, tornadoes, floods or droughts have increased on climate time scales either in the U.S. or globally."

One big change between today and 100 years ago is that humans are much more capable of dealing with hurricanes and earthquakes and other acts of God.

Homes and buildings are better built to withstand severe storms and alert systems are much more accurate to warn people of the coming storms. As a result, globally, weather-related losses have actually decreased by about 25% as a proportion of GDP since 1990.

The liberal hubris is that government can do anything to change the earth's climate or prevent the next big hurricane, earthquake or monsoon. These are the people in Washington who can't run a website, can't deliver the mail and can't balance a budget. But they are going to prevent droughts and forest fires.

The President's doomsday claims last week served mostly to undermine the alarmists' case for radical action on climate change. Truth always seems to be the first casualty in this debate.

This is the tactic of tyrants. Americans are wise to be wary about giving up our basic freedoms and lowering our standard of living to combat an exaggerated crisis.

### AFF --- AT: Climate Satellites / Research

#### **NOAA climate research and models empirically fail --- too much is spent on unreliable satellites**

Representative Smith, 14 (4/30/2014, Rep. Smith, Lamar - (R-TX), Congressional Documents and Publications. House Science, Space, and Technology Subcommittee on Environment Hearing - "An Overview of the National Oceanic and Atmospheric Administration Budget Request for FY2015," Factiva, JMP)

Chairman Smith: Thank you Chairman Schweikert, and thank you Administrator Sullivan for being with us here today. Let me congratulate you on being named one of Time Magazine's 100 most influential people of 2014.

Our Committee oversees NOAA's more than five billion dollar budget. NOAA is responsible for critical science activities related to oceans, weather and climate.

Today we are here to discuss the President's FY15 budget request for NOAA of $5.5 billion, a 3.3 percent increase over 2014 levels. While I support many of these areas of research and forecasting, other parts of the President's FY15 budget request are harder to justify.

For example, the Administration's request substantially increases funding for climate research and for some non-critical climate satellite activities. In comparison, funding for the National Weather Service and weather forecasting research is essentially flat.

Almost $190 million is requested for climate research, more than twice the amount dedicated to weather research. There are 13 other agencies that are involved in climate change research, and according to the Congressional Research Service, they have spent $77 billion between 2008 and 2013.

For example, in addition to NOAA, NASA, the Department of Energy, and the National Science Foundation also carry out climate change modeling.

Unfortunately, NOAA's models do not match up with observed changes and have not predicted regional climate changes. And NOAA's website, Climate.Gov, includes non-peer reviewed materials promoting climate alarmism for children.

These misguided priorities are troubling. Instead of hyping climate alarmism, NOAA should focus its efforts on other areas such as improving weather forecasting.

America's leadership has slipped in severe weather forecasting. European weather models routinely predict America's weather better than we can.

I am also concerned that NOAA's satellite division now comprises over 40 percent of the total budget request for the agency, at over $2 billion. In 2008, the satellite budget came in under a billion dollars and was roughly one-quarter of NOAA's overall spending. The budget for this office has ballooned dramatically over the last decade.

For instance, the Joint Polar Satellite System program has been plagued with runaway costs and mismanagement, which raises questions about future funding for the project and its expected launch dates.

Even NOAA's own optimistic schedule would still leave us with a gap for critical weather data in the middle part of this decade.

Meanwhile the chronic cost over-runs of NOAA's satellites have forced significant reductions in funding for important activities in areas such as oceans, fisheries, and weather.

NOAA is a mission-oriented agency, and this Committee supports these core priorities. We face fiscal constraints that force us to make difficult choices about our science and technology resources.

Rather than devoting limited dollars to duplicative and alarmist climate change activities, NOAA should focus on research and forecasting capabilities that protect lives and property.

#### NASA budget will cover costs of climate research gathered by JPSS satellites

Leone, 14 (4/28/2014, Dan, “JPSS Satellites Will Gather Climate Measurements After All,” <http://www.spacenews.com/article/civil-space/40365jpss-satellites-will-gather-climate-measurements-after-all>, JMP)

WASHINGTON — Climate measurements stripped out of the budget for the Joint Polar Satellite System (JPSS) program in 2014 will be gathered by JPSS satellites after all, according to the plan put together by NASA, the new bill-payer for climate research formerly funded by the National Oceanic and Atmospheric Administration.

JPSS-1 is set to launch in 2017. It will carry five instruments, including two that will make the sort of climate measurements that Congress, at the White House’s request, gave NASA responsibility for as part of the $1.1 trillion Consolidated Appropriations Act for 2014 (H.R. 3547), signed in January to fund federal spending through September. NOAA operates U.S. civilian weather satellites, but pays NASA to oversee spacecraft design and development.

After JPSS-1, the climate measurements gathered by that satellite via its Ozone Mapping and Profiler Suite and the Clouds and the Earth’s Radiant Energy System become NASA’s financial responsibility. NASA plans to fulfill this responsibility by flying three instruments, including two notionally manifested for launch with JPSS-2 in 2021, and one that would be delivered to a commercial satellite company in 2019 to fly as a hosted payload in geostationary orbit.

The three instruments are the Radiation Budget Instrument, to be adapted from the design for the Clouds and the Earth’s Radiant Energy System; the Limb Profiler, one of three instruments that make up the Ozone Mapping and Profiler Suite; and the Total Solar Irradiance Sensor. The first two are bound for JPSS-2, the third for a commercial host, under NASA’s plan. NASA manages development of these three instruments under an Earth Science budget line called Radiation Ozone Atmospheric Measurements, or ROAM, for which the agency is seeking $240 million from Congress during the next five years.

These instruments, or instruments like them, were originally part of the joint civil-military National Polar-orbiting Operational Environmental Satellite System that was canceled in 2010 and sparked the creation of the JPSS program. NOAA planned to launch the orphaned instruments in 2016 aboard a satellite called Polar Free Flyer, but that plan was effectively canceled by the 2014 spending bill that transferred responsibility for polar-orbiting climate measurements to NASA.

Before spending a cent on instrument development, however, NASA has to provide lawmakers with “a notional budget and schedule profile covering the budget runout period as well as a description of the effect this funding will have on the achievement of existing NASA priorities as recommended in the 2007 Earth Science decadal survey,” according to a report that accompanied the 2014 omnibus spending bill.

NASA spokesman Stephen Cole said April 25 that NASA delivered the report to Congress in early April but that there has been “no decision yet from the Hill.”

NASA’s plan to slap a pair of climate instruments on JPSS-2, coupled with NOAA’s March 28 announcement that it will bulk-order copies of JPSS instruments for the third and fourth satellites in the constellation, means the instrument manifest for the JPSS constellation is beginning to gel.

JPSS-1 and JPSS-2 would be virtual copies of the Suomi NPP testbed that launched in October 2011 and was pressed into an operational role as the first satellite in the JPSS constellation.

JPSS-3 and JPSS-4 would have similar instruments. NOAA’s March 28 procurement note shows the agency plans to equip each satellite, as expected, with an Advanced Technology Microwave Sounder from Northrop Grumman Electronic Systems; a Cross-Track Infrared Sounder from Exelis Geospatial Systems; a Visible Infrared Imager Radiometer Suite instrument from Raytheon Space and Airborne Systems; and an Ozone Mapping and Profiler Suite instrument from Ball Aerospace & Technologies.

NOAA will also order extra copies of the Advanced Technology Microwave Sounder and the Cross-Track Infrared Sounder. The extras keep NOAA’s bases covered if one of the JPSS satellites should fail sooner than expected, or if the agency decides to build the two-instrument, mini-polar-orbiter endorsed in 2013 by an independent review panel led by former Lockheed Martin executive A. Thomas Young.

The Advanced Technology Microwave Sounder and the Cross-Track Infrared Sounder feed the day-to-day weather forecasting models the White House and Congress aimed to protect when they relieved NOAA of financial responsibility for polar-orbiting climate measurements in the JPSS program.

Asked via email whether the weather agency planned to save the two instruments for a smaller polar orbiter, Mary Kicza, outgoing NOAA assistant administrator for satellite and information services, said only that “our plan is to be prepared for the possibility.”